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HEALTH AND SAFETY WORK PLAN FOR THE WORK PLAN DELINEATION AND
CONFIRMATION SAMPLING TO SUPPORT THE REMOVAL ACTION AT THE TRUMAN
ANNEX WATER TOWER SITE WITH TRANSMITTAL LETTER NAS KEY WEST FL

6/1/2004
TETRA TECH NUS



TETRATECH NUS, INC.

AIK-04-0117

June 1, 2004

Project Number HK N0639

via FedEx

Commander
Department of the Navy
SOUTHDIV NAVFACENGCOM
ATTN: Jim Reed (Code ES33)
P.O. Box 190010
North Charleston, South Carolina 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 0349

Subject: HASP for the Work Plan Delineation and Confirmation Sampling to Support the Removal Action at the Truman Annex Water Tower Site, Rev. 0, Naval Air Station, Key West, Florida

Dear Mr. Reed:

I have enclosed a CD containing the PDF file for the HASP for the Work Plan Delineation and Confirmation Sampling to Support the Removal Action at the Truman Annex Water Tower Site, Rev. 0, Naval Air Station, Key West, Florida. The file is being distributed to some of the members of the NAS Key West Partnering Team via U.S. mail for their convenience and to meet TtNUS's contractual obligation under CTO 0349. I am not expecting to receive any comments on this document.

Please call me at (803) 649-7963, extension 345, if you have any questions regarding the enclosed document.

Sincerely,

C. M. Bryan
Project Manager

CMB:spc

c: Ms. Debbie Wroblewski (Cover Letter Only)
Ms. T. Vaught, FDEP
Mr. R. Courtright, NAS Key West

Mr. M. Perry/File
Files 0639-4.2

**HEALTH AND SAFETY PLAN
FOR
DELINEATION AND CONFIRMATION SAMPLING TO
SUPPORT THE REMOVAL ACTION AT THE
TRUMAN ANNEX WATER TOWER SITE**

**NAVAL AIR STATION KEY WEST
KEY WEST, FLORIDA**



**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND**

**Contract No. N62467-94-D-0888
Contract Task Order 0349**

MAY 2004

HEALTH AND SAFETY PLAN
FOR
DELINEATION AND CONFIRMATION SAMPLING
TO SUPPORT THE REMOVAL ACTION
AT THE TRUMAN ANNEX WATER TOWER SITE

NAVAL AIR STATION KEY WEST
KEY WEST, FLORIDA

Submitted to:

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CONTRACT NO. N62467-94-D-0888
CONTRACT TASK ORDER 0349

May 2004

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been developed to provide practices and procedures for Tetra Tech NUS, Inc. (TtNUS) personnel engaged in delineation and confirmation sampling to support the removal action at the Truman Annex Water Tower site at the Naval Air Station (NAS) Key West, Florida. This work is authorized under the Comprehensive Long - Term Environmental Action Navy (CLEAN) contract, administered through the U.S. Navy Southern Division Naval Facilities Engineering Command, as defined under Contract No. N62467-94-D-0888; Contract Task Order Number 0349. This HASP must be used in conjunction with the TtNUS Health and Safety Guidance Manual. Both of these documents must be present at the site during the performance of all site activities. The Guidance Manual provides detailed information pertaining to the HASP as well as applicable TtNUS Standard Operating Procedures (SOPs). This HASP and the contents of the Guidance Manual were developed to comply with the requirements stipulated in 29 CFR 1910.120 (OSHA's Hazardous Waste Operations and Emergency Response Standard).

This HASP has been developed using the latest available information regarding known or suspected chemical contaminants and potential physical hazards associated with the proposed work at the sites of interest. The HASP will be modified if new information becomes available. All changes to the HASP will be made with the approval of the TtNUS Project Health and Safety Officer (PHSO) and the TtNUS Health and Safety Manager (HSM). Requests for modifications to the HASP will be directed to the PHSO, who will determine if the changes are necessary. The PHSO will notify the Task Order Manager (TOM), who will notify all affected personnel of changes.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibility for site safety and health for TtNUS employees engaged in onsite activities. Personnel assigned to these positions will exercise the primary responsibility for all onsite health and safety. These persons will be the primary points of contact for any questions regarding the safety and health procedures and the selected control measures that are to be implemented for onsite activities.

- The TtNUS TOM is responsible for the overall direction of health and safety for this project.
- The PHSO is responsible for developing this HASP in accordance with applicable OSHA regulations. Specific responsibilities include:
 - Providing information regarding site contaminants and physical hazards associated with the site.

- Establishing air monitoring and decontamination procedures.
 - Assigning personal protective equipment based on task and potential hazards.
 - Determining emergency response procedures and emergency contacts.
 - Stipulating training requirements and reviewing appropriate training and medical surveillance certificates.
 - Providing standard work practices to minimize potential injuries and exposures associated with hazardous waste work.
 - Modifying this HASP, as it becomes necessary.
- The TtNUS Field Operations Leader (FOL) is responsible for implementation of the HASP with the assistance of an appointed SSO. The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.
 - The SSO supports site activities by advising the FOL on all aspects of health and safety on site. These duties may include:
 - Coordinating all health and safety activities with the FOL.
 - Selecting, inspecting, and maintaining personal protective equipment.
 - Establishing work zones and control points in areas of operation.
 - Implementing air monitoring program for onsite activities.
 - Verifying training and medical clearance of onsite personnel status in relation to site activities.
 - Implementing Hazard Communication, Respiratory Protection Programs, and other associated health and safety programs as they may apply to site activities.
 - Coordinating emergency services.
 - Providing site-specific training for all onsite personnel.
 - Investigating all accidents and injuries (see Attachment I - Illness/Injury Procedure and Report Form)
 - Providing input to the PHSO regarding the need to modify, this HASP, or applicable health and safety associated documents as per site-specific requirements.
 - Compliance with the requirements stipulated in this HASP is monitored by the SSO and coordinated through the TtNUS CLEAN HSM.

Note: In some cases one person may be designated responsibilities for more than one position. For example, at NAS Key West, the FOL may also be responsible for SSO duties. This action will be performed only as credentials or experience permits.

1.2 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: Naval Air Station Key West **Client Contact:** Mr. Robert Courtright
Key West, Florida **Phone Number:** (305) 293-2881

Scheduled Activities: TtNUS will conduct delineation and confirmation sampling in support of the removal action at the Truman Annex Water Tower Site. See Section 3.0 and 4.0 for details concerning details site background and scope of work.

Dates of scheduled activities: June 2004

Project Team:

TtNUS Management Personnel:

Chuck Bryan

TBD

TBD

Matthew M. Soltis, CIH, CSP

Donald J. Westerhoff, CSP

Discipline/Tasks Assigned:

Task Order Manager (TOM)

Field Operations Leader (FOL)

Site Safety Officer (SSO)

CLEAN Health and Safety Manager

Project Health and Safety Officer (PHSO)

Other Potential TtNUS Project Personnel:

Hazard Assessment (for purpose of 29 CFR 1910.132) for HASP preparation has been conducted by:
Donald J. Westerhoff, CSP

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section has been developed as part of a planning effort to direct and guide field personnel in the event of an emergency. All site activities will be coordinated with the client contact, Robert Courtright. In the event of an emergency which cannot be mitigated using onsite resources, personnel will evacuate to a safe place of refuge and the appropriate emergency response agencies will be notified. It has been determined that the majority of potential emergency situations would be better supported by outside emergency responders. Based on this determination, TtNUS personnel will not provide emergency response support beyond the capabilities of onsite response. Workers who are ill or who have suffered a non-serious injury may be transported by site personnel to nearby medical facilities, provided that such transport does not aggravate or further endanger the welfare of the injured/ill person. The emergency response agencies listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time. NAS Key West contact Robert Courtright will be notified anytime outside response agencies are contacted. This Emergency Action Plan conforms to the requirements of 29 CFR 1910.38(a), as allowed in 29 CFR 1910.120(I)(1)(ii).

TtNUS will, through necessary services, provide the following emergency action measures:

- Initial stage fire fighting support and prevention
- Initial spill control and containment measures and prevention
- Removal of personnel from emergency situations
- Initial medical support for injuries or illnesses requiring basic first-aid
- Site control and security measures as necessary

2.2 EMERGENCY PLANNING

Through the initial hazard/risk assessment effort, emergencies resulting from chemical, physical, or fire hazards are considered to be unlikely to be encountered during site activities. Nonetheless, to minimize and eliminate the potential for any emergency situations, emergency planning activities will include the following (which are the responsibility of the SSO and/or the FOL):

- Coordinating with local Emergency Response personnel to ensure that TtNUS emergency action activities are compatible with existing emergency response procedures. Base Fire Protection and

Emergency Services will be notified of scheduled events and activities. This is most imperative in situations where their services may be required.

- Establishing and maintaining information at the project staging area (Support Zone) for easy access in the event of an emergency. This information will include the following:
 - Chemical Inventory (of chemicals used onsite), with Material Safety Data Sheets.
 - Onsite personnel medical records (Medical Data Sheets).
 - A log book identifying personnel onsite each day.
 - Hospital route maps with directions (these should also be placed in each site vehicle).
 - Emergency Notification - phone numbers.

The TtNUS FOL will be responsible for the following tasks:

- Identifying a chain of command for emergency action.
- Educating site workers to the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention, where possible.
- Periodically performing practice drills to ensure site workers are familiar with incidental response measures.
- Providing the necessary equipment to safely accomplish identified tasks.

2.3 EMERGENCY RECOGNITION AND PREVENTION

2.3.1 Recognition

Emergency situations that may be encountered during site activities will generally be recognized by visual observation. To adequately recognize chemical exposures, site personnel must have a clear knowledge of signs and symptoms of exposure associated with site contaminants. This information is provided in Table 6-1. Tasks to be performed at the site, potential hazards associated with those tasks and the recommended control methods are discussed in detail in Sections 5.0 and 6.0. Additionally, early recognition of hazards will be supported by daily site surveys to eliminate any situation predisposed to an emergency. The FOL and/or the SSO will be responsible for performing surveys of work areas prior to initiating site operations and periodically while operations are being conducted. Survey findings will be documented by the FOL and/or the SSO in the Site Health and Safety logbook, however, all site

personnel will be responsible for reporting hazardous situations. Where potential hazards exist, TtNUS will initiate control measures to prevent adverse effects to human health and the environment.

The above actions will provide early recognition for potential emergency situations, and allow TtNUS to instigate necessary control measures. However, if the FOL and the SSO determine that control measures are not sufficient to eliminate the hazard, TtNUS will withdraw from the site and notify the appropriate response agencies listed in Table 2-1.

2.3.2 Prevention

TtNUS personnel will minimize the potential for emergencies by following the Health and Safety Guidance Manual and ensuring compliance with the HASP and applicable OSHA regulations. Daily site surveys of work areas, prior to the commencement of that day's activities, by the FOL and/or the SSO will also assist in prevention of illness/injuries when hazards are recognized early and control measures initiated.

2.4 EVACUATION ROUTES, PROCEDURES, AND PLACES OF REFUGE

An evacuation will be initiated whenever recommended hazard controls are insufficient to protect the health, safety or welfare of site workers. Specific examples of conditions that may initiate an evacuation include, but are not limited to the following: severe weather conditions; fire or explosion; monitoring instrumentation readings which indicate levels of contamination are greater than instituted action levels; and evidence of personnel overexposure to potential site contaminants.

In the event of an emergency requiring evacuation, all personnel will immediately stop activities and report to the designated safe place of refuge unless doing so would pose additional risks. When evacuation to the primary place of refuge is not possible, personnel will proceed to a designated alternate location and remain until further notification from the TtNUS FOL. Safe places of refuge will be identified prior to the commencement of site activities by the SSO and will be conveyed to personnel as part of the pre-activities training session. This information will be reiterated during daily safety meetings. Whenever possible, the safe place of refuge will also serve as the telephone communications point for that area. During an evacuation, personnel will remain at the refuge location until directed otherwise by the TtNUS FOL or the on-site Incident Commander of the Emergency Response Team. The FOL or the SSO will perform a head count at this location to account for and to confirm the location of all site personnel. Emergency response personnel will be immediately notified of any unaccounted personnel. The SSO will document the names of all personnel onsite (on a daily basis) in the site Health and Safety Logbook. This information will be utilized to perform the head count in the event of an emergency.

Evacuation procedures will be discussed during the pre-activities training session, prior to the initiation of project tasks. Evacuation routes from the site and safe places of refuge are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. Additionally, site location and meteorological conditions (i.e., wind speed and direction) may dictate evacuation routes. As a result, assembly points will be selected and communicated to the workers relative to the site location where work is being performed. Evacuation should always take place in an upwind direction from the site.

2.5 DECONTAMINATION PROCEDURES / EMERGENCY MEDICAL TREATMENT

During any site evacuation, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of site workers. Decontamination will not be performed if the incident warrants immediate evacuation. However, it is unlikely that an evacuation would occur which would require workers to evacuate the site without first performing the necessary decontamination procedures.

TtNUS personnel will perform removal of personnel from emergency situations and may provide initial medical support for injury/illnesses requiring only first-aid level support. Medical attention above that level will require assistance and support from the designated emergency response agencies. Attachment I provides the procedure to follow when reporting an injury/illness, and the form to be used for this purpose. **If the emergency involves personnel exposures to chemicals, follow the steps provided in Figure 2-1.**

2.6 EMERGENCY CONTACTS

Prior to initiating field activities, all personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an accident. Table 2-1 provides a list of emergency contacts and their associated telephone numbers. This table must be posted where it is readily available to all site personnel. Facility maps should also be posted showing potential evacuation routes and designated meeting areas.

TABLE 2-1

**EMERGENCY REFERENCES
NAVAL AIR STATION
KEY WEST, FLORIDA**

AGENCY	TELEPHONE
Key West Police/Rescue Services	(305) 293-2971
NAS Key West Point of Contact, Robert Courtright	(305) 293-2881
Base Police	(305) 293-2114
Base Fire Department Boca Chica	(305) 293-3333
Hospital: Lower Florida Keys Health System	(305) 294-5531
Base Officer of the Day (OOD)	(305) 293-2971
Poison Control Center	(800) 222-1222
Chemtrec	(800) 424-9300
National Response Center	(800) 424-8802
Task Order Manager Chuck Bryan	(803) 649-7963 x345
Field Operations Leader	
Site Safety Officer	
Health and Safety Manager, Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health and Safety Officer, Donald J. Westerhoff, CSP	(412) 921-7281

2.7 EMERGENCY ROUTE TO HOSPITAL

The closest hospital to NAS Key West is Lower Florida Keys Health System. Directions are as follows:

From Boca Chica, exit NAS Key West and get on U.S. 1 South. Go west across the bridge; pass Texaco and turn right on Junior College Road. Golf course will be on left; and on right, you will see hospital sign. Follow road to Hospital, which will be on the left. Hospital is located at 5900 College Road on Stock Island.

A map indicating the travel route from the site to the Hospital will be inserted as Figure 2-2.

Figure 2-1
Route to Hospital



2.8 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

TtNUS personnel will be working in close proximity to each other at NAS Key West. As a result, hand signals, voice commands, and line of site communication will be sufficient to alert site personnel of an emergency. When project tasks are performed simultaneously on different sites, vehicle horns will be used to communicate emergency situations.

If an emergency warranting evacuation occurs, the following procedures are to be initiated:

- Initiate the evacuation via hand signals, voice commands, line of site communication, or radios/cellular communication.
- Report to the designated refuge point.
- Once all non-essential personnel are evacuated, appropriate response procedures will be enacted to control the situation.
- Describe to the FOL (FOL will serve as the Incident Coordinator) pertinent incident details.

In the event that site personnel cannot mitigate the hazardous situation, the FOL and SSO will enact emergency notification procedures to secure additional assistance in the following manner:

Call the pertinent emergency contacts listed in Table 2-1 and report the incident. Give the emergency operator the location of the emergency, the type of emergency, the number of injured, and a brief description of the incident. Stay on the phone and follow the instructions given by the operator. The operator will then notify and dispatch the proper emergency response agencies.

2.9 PPE AND EMERGENCY EQUIPMENT

A first aid kit, eye wash units (or bottles of disposable eyewash solution) and fire extinguishers (strategically placed) will be maintained onsite and shall be immediately available for use in the event of an emergency. This equipment will be located in the field office as well as in each site vehicle. At least one first aid kit supplied with equipment to protect against bloodborne pathogens will also be available on site. Personnel identified within the field crew with bloodborne pathogen and first-aid training will be the only personnel permitted to offer first-aid assistance.

As soon as possible Navy contact Robert Courtright must be informed of any incident or accident that requires medical attention.

Any pertinent information regarding allergies to medications or other special conditions will be provided to medical services personnel. This information is listed on Medical Data Sheets filed onsite (see Attachment II of this HASP). If an exposure to hazardous materials has occurred, provide hazard information from Table 6-1 to medical service personnel.

Figure 2-2 Emergency Response Protocol

The purpose of this protocol is to provide guidance for the medical management of injury situations.

In the event of a personnel injury or accident:

- Rescue, when necessary, employing proper equipment and methods.
- Give attention to emergency health problems -- breathing, cardiac function, bleeding, and shock.
- Transfer the victim to the medical facility designated in this HASP by suitable and appropriate conveyance (i.e. ambulance for serious events)
- Obtain as much exposure history as possible (a Potential Exposure report is attached).
- If the injured person is a Tetra Tech NUS employee, call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the WorkCare physician. WorkCare will contact the medical facility and request specific testing which may be appropriate. WorkCare physicians will monitor the care of the victim. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call WorkCare at 1-800-455-6155 and enter Extension 109, or follow the voice prompt after hours and on weekends and be prepared to provide:
 - Any known information about the nature of the injury.
 - As much of the exposure history as was feasible to determine in the time allowed.
 - Name and phone number of the medical facility to which the victim(s) has/have been taken.
 - Name(s) of the involved Tetra Tech NUS, Inc. employee(s).
 - Name and phone number of an informed site officer who will be responsible for further investigations.
 - Fax appropriate information to WorkCare at (714) 456-2154.
- Contact Corporate Health and Safety Department (Matt Soltis) at 1-800-245-2730.
- Contact Corporate Human Resources Manager (Marilyn Duffy) at 1-800-245-2730.

As data is gathered and the scenario becomes more clearly defined, this information should be forwarded to WorkCare.

WorkCare will compile the results of all data and provide a summary report of the incident. A copy of this report will be placed in each victim's medical file in addition to being distributed to appropriately designated company officials.

Each involved worker will receive a letter describing the incident but deleting any personal or individual comments. A personalized letter describing the individual findings/results will accompany this generalized summary. A copy of the personal letter will be filed in the continuing medical file maintained by WorkCare.

FIGURE 2-2 (continued)
POTENTIAL EXPOSURE REPORT

Name: _____ Date of Exposure: _____

Social Security No.: _____ Age: _____ Sex: _____

Client Contact: _____ Phone No.: _____

Company Name: _____

I. Exposing Agent

Name of Product or Chemicals (if known): _____

Characteristics (if the name is not known)

Solid Liquid Gas Fume Mist Vapor

II. Dose Determinants

What was individual doing? _____

How long did individual work in area before signs/symptoms developed? _____

Was protective gear being used? If yes, what was the PPE? _____

Was their skin contact? _____

Was the exposing agent inhaled? _____

Were other persons exposed? If yes, did they experience symptoms? _____

III. Signs and Symptoms (check off appropriate symptoms)

Immediately With Exposure:

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath

Chest Tightness / Pressure
Nausea / Vomiting
Dizziness
Weakness

Delayed Symptoms:

Weakness
Nausea / Vomiting
Shortness of Breath
Cough

Loss of Appetite
Abdominal Pain
Headache
Numbness / Tingling

IV. Present Status of Symptoms (check off appropriate symptoms)

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Cyanosis

Nausea / Vomiting
Dizziness
Weakness
Loss of Appetite
Abdominal Pain
Numbness / Tingling

Have symptoms: (please check off appropriate response and give duration of symptoms)

Improved: _____ Worsened: _____ Remained Unchanged: _____

V. Treatment of Symptoms (check off appropriate response)

None: _____ Self-Medicating: _____ Physician Treated: _____

3.0 SITE BACKGROUND

3.1 SITE HISTORY

NAS Key West is in southern Monroe County, Florida. The U.S. Navy manages 6,323 acres of land divided into twenty separate tracts in the lower Florida Keys, concentrated around Key West and Boca Chica Key. The Naval Station at Key West was disestablished in 1974, resulting in the relocation of several units. At present, NAS Key West is proceeding with realignment of aviation operations, a research laboratory, communications intelligence, counternarcotics air surveillance operations, a weather service, and several other activities on Key West. In addition to the Naval activities and units, other DOD and Federal agencies at NAS Key West include the U.S. Air Force, U.S. Army, and U.S. Coast Guard.

Several installations in various parts of the lower Florida Keys comprise the Naval Complex at Key West. Most of these are on Key West and Boca Chica Key. Key West, one of the two westernmost major islands of the Florida Keys, is approximately 150 miles southwest of Miami and 90 miles north of Havana, Cuba. Key West connects to the mainland by the Overseas Highway (U.S. Highway No. 1). The topography at the NAS Key West is generally flat.

3.2 PROJECT SITE DESCRIPTION

3.2.1 Truman Annex Water Tower Site

The DRMO Waste Storage Area at Truman Annex was used primarily to store metal debris, including motors, vehicles, boats, refugee debris, and fuel trucks. Some hazardous materials were also stored at the DRMO Waste Storage Area. The DRMO Waste Storage Area was remediated in 1999. Approximately 16,000 tons of soil were removed from the area and replaced with clean backfill. In 2003, the area was transferred from Navy ownership to the City of Key West. A water tower remained on the property. The water tower and a 170-foot by 172-foot area immediately surrounding the tower was retained by NAS Key West. In 2003, the water tower was removed. However, prior to and during the removal process, the lead-based paint on the tower contaminated soil beneath and surrounding the tower.

4.0 SCOPE OF WORK

This section describes the project tasks that will be performed as part of the delineation and confirmation sampling at the Truman Annex Water Tower Site at NAS Key West. Each site task has been evaluated and the associated hazards and recommended control measures are listed in Table 5-1 of this HASP. If new tasks are to be performed at the site, Table 5-1 and this section will be modified accordingly. Specific tasks to be conducted include, but are not necessarily limited to, the following:

- Mobilization and demobilization
- Delineation soil sampling using Direct Push Technology (DPT)
- Confirmation soil sampling
- X-ray Fluorescence (XRF) field analysis
- Decontamination of equipment
- Surveying of sampling locations using global positioning system (GPS)
- Geophysical Surveys

The above listing represents a summarization of the tasks as they apply to the scope and application of this HASP. For more detailed description of the associated tasks refer to the Work Plan for Delineation and Confirmation Sampling to Support the Removal Action at the Truman Annex Water Tower Site. If additional tasks are determined to be necessary, this HASP will be amended and a hazard evaluation will be performed for each additional task to be conducted at the site.

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES SUMMARIZATION

Table 5-1 of this section serves as the primary portion of this HASP and identifies the tasks that are to be performed as part of the scope of work. This table may be modified if new or additional tasks become necessary. For each of the planned tasks, Table 5-1 specifies the anticipated hazards, recommended control measures, air monitoring recommendations, required Personal Protective Equipment (PPE), and decontamination measures.

Through using this table, site personnel can determine which hazards are associated with each task and at each site, and what associated control measures are necessary to minimize potential exposure or injuries related to those hazards. The table also assists field team members in determining which PPE and decontamination procedures to use as well as proper air monitoring techniques.

As discussed earlier, a Health and Safety Guidance Manual accompanies this table and HASP. The manual has been designed to further explain supporting programs and elements for other site-specific aspects as required by 29 CFR 1910.120. The Guidance Manual should be referenced for additional information regarding air monitoring instrumentation, decontamination activities, emergency response, hazard assessments, hazard communication and hearing conservation programs, medical surveillance, PPE, respiratory protection, site control measures, standard work practices, and training requirements. Many of Tetra Tech NUS' SOPs are also provided in the Guidance Manual.

Safe Work Permits issued for all exclusion zone activities (See Section 9.2) will use elements defined in Table 5-1 as its primary reference. The FOL and/or the SSO completing the Safe Work Permit (SWP) will be required to add certain task/site-specific information. The SWPs are to be used by the SSO as the outline for task-specific tailgate safety briefings, which are to be conducted prior to the initiation of each task, and at the beginning of each work shift.

5.1 GENERAL SAFE WORK PRACTICES

In addition to the task-specific work practices identified on Table 5-1, the following general safe work practices are to be followed when conducting work on-site. These safe work practices address a pattern of general precautions and measures for reducing risks associated with site operations. This list is not all-inclusive and may be amended as necessary.

- Eating, drinking, chewing gum or tobacco, taking medication, or smoking is prohibited in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists.
- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. A thorough shower and washing must be conducted as soon as possible if excessive skin contamination occurs.
- Avoid contact with potentially contaminated substances. Avoid puddles, pools, mud, or other such areas. Avoid, whenever possible, kneeling on the ground or leaning or sitting on equipment. Keep monitoring equipment away from potentially contaminated surfaces.
- Obey all instructions in the site-specific HASP.
- Take note of the location of the nearest telephone and all emergency telephone numbers. See Section 2.0, Table 2-1.
- Attend briefings on anticipated hazards, equipment requirements, safe work permits, emergency procedures, and communication methods before going on site.
- Plan and mark entrance, exit, and emergency escape routes. See Section 2.0.
- Rehearse unfamiliar operations prior to implementation.
- Buddies should maintain visual contact with each other and with other on-site team members by remaining in close proximity to assist each other in case of emergency.
- Establish appropriate Safety Zones including Support, Contamination Reduction, and Exclusion Zones.
- Minimize the number of personnel and equipment in contaminated areas (such as the Exclusion Zone). Non-essential vehicles and equipment should remain within the Support Zone.
- Establish appropriate decontamination procedures for leaving the site.
- Immediately report all injuries, illnesses, and unsafe conditions, practices, and equipment to the Site Safety Officer (SSO).

- Matches and lighters are restricted from entering in the Exclusion Zone or Contamination Reduction Zone.
- Observe coworkers for signs of toxic exposure and heat or cold stress.
- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

5.2 DPT OPERATIONS - SAFE WORK PRACTICES

The following Safe Work Practices are to be followed when working in or around DPT operations.

5.2.1 Before DPT Operations

- Identify all underground utilities and buried structures before drilling. Use the Utility Locating and Excavation Clearance Standard Operating Procedure provided in Attachment V.
- A Competent Person (the SSO or designee) will inspect all DPT rigs, prior to the acceptance of the equipment at the site and prior to the use of the equipment. All repairs or deficiencies identified will be corrected prior to use. The inspection will be accomplished using the Equipment Inspection Checklist provided in Attachment VI. Inspection frequencies will be once every 10-day shift or following repairs.
- The work area around the point of operation will be graded to the extent possible to remove any trip hazards near or surrounding operating equipment.
- An equipment staging and lay-down plan will be established. The purpose of this area is to keep the work area clear of clutter and slips, trips, and fall hazards.
- All potentially contaminated tooling will be wrapped in polyethylene sheeting for storage and transport to the centrally located decontamination unit.

5.2.2 During DPT Operations

- Minimize contact to the extent possible with contaminated tooling and environmental media.

- Support functions (sampling and screening stations) will be maintained a minimum distance from the DPT rig of not less than 25 feet from the point of operation to remove these activities from within physical hazard boundaries.
- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the DPT rig.
- In order to minimize contact with potentially contaminated tooling and media and to minimize lifting hazards, multiple personnel should move heavy tooling, where necessary.
- Only personnel absolutely essential to the work activity will be allowed in the exclusion zone. Site visitors will be escorted at all times.

5.2.3 After DPT Operations

- All equipment used within the exclusion zone will undergo a complete decontamination and evaluation by the SSO to determine cleanliness prior to moving to the next location, exiting the site, or prior to down time for maintenance.
- All motorized equipment will be fueled prior to the commencement of the day's activities.
- When not in use all DPT rigs will be shutdown, emergency brakes set, and wheels chocked.
- All areas subjected to subsurface investigative methods will be restored to equal or better condition than original to remove any contamination brought to the surface and to remove any physical hazards. In situations where these hazards cannot be removed these areas will be barricaded to minimize the impact on field crews working in the area.

5.3 SAFE WORK PRACTICES WHEN WORKING AROUND EXCAVATING EQUIPMENT

During confirmation soil sampling activities, TtNUS personnel will be working around heavy equipment (excavators, bull dozers, dump trucks or other similar equipment) that will be used to remove and transport lead contaminated soils. Contractors responsible for these activities will submit their own HASP and TtNUS personnel may be responsible for following portions of that plan in addition to the requirements provided in this HASP. The following safe work practices will be followed to minimize hazards associated with these activities.

- Excavation of lead contaminated soils presents an increased exposure concern given the disturbance of the soils and the potential for creating airborne dusts that may be inhaled. Confirmation sampling does not require TtNUS personnel to be in close proximity to excavation activities and whenever possible, TtNUS personnel will station themselves in an upwind location away from potential dusts. This will also be facilitated by the FOL who will be responsible for coordinating activities with the remediation contractor.
- TtNUS personnel will be required to wear high visibility reflective vest when working in areas where heavy equipment is present. When approaching a work area, ensure two-way visual contact is maintained with the equipment operator and maintain a position outside of the swing radius of the equipment (boom or bucket). Do not assume the equipment operators see you – often the operators' view is obscured.
- Do not access an excavation area to collect a confirmation sample until the equipment operator acknowledges your presence and understands your intentions. Equipment operators in the vicinity of the confirmation must sit idle with buckets resting on the ground surface when TtNUS personnel collect the samples.
- If feasible, use two personnel to collect the confirmation samples, one to collect the sample the other to serve as a spotter.
- Although not anticipated, site personnel will not be permitted to enter open excavations that are prone to collapse or any excavation greater than 3 feet deep.

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TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR
NAVAL AIR STATION, KEY WEST, FLORIDA

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment <i>Italicize text represents optional equipment to be worn when conditions require.</i>	Decontamination Procedures
Delineation sampling using DPT methods It is anticipated that 80 soil samples will be collected in a grid pattern. Samples will be analyzed using XRF.	<p>Chemical Hazards:</p> <p>1) Lead is the primary contaminant of concern associated with the Truman Annex Water Tower Site. Delineation sampling using DPT methods is not anticipated to create airborne dusts. Primary routes of exposure are anticipated to be through incidental ingestion or skin contact. Observations of site dusts, will require area wetting methods to be implemented to control airborne dusts. If area wetting is not successful in controlling airborne dusts, this approach and the HASP will require modification.</p> <p>Further information on this contaminant is presented in Table 6-1.</p> <p>2) Transfer of contamination into clean areas or onto persons</p> <p>Physical hazards:</p> <p>3) Pinch/compression points</p> <p>4) Noise</p> <p>5) Energized systems</p> <p>6) Lifting</p> <p>7) Cuts and Lacerations</p> <p>8) Natural Hazards (Insect/animal bites and stings)</p> <p>9) Inclement weather/heat stress</p>	<p>1) Avoid contact with potentially contaminated soils. Observations of airborne dust will require notification of the PHSO. Use safe work practices, PPE, and decontamination/personal hygiene practices to minimize potential exposures via incidental ingestion and skin contact.</p> <p>2) Decontaminate all equipment and supplies between boreholes and prior to leaving the site. Visual inspect to ensure no contamination exists.</p> <p>3) All equipment to be used will be</p> <ul style="list-style-type: none">- Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600,.601,.602), and manufacturers design and documented as such using the Equipment Inspection Sheet (See Attachment VI of this HASP).- Operated by qualified operators, and knowledgeable ground crew.- Used within establish safe zones and routes of approach- Only manufacturer approved equipment may be used in conjunction with equipment repair procedures (i.e. pins, etc.). <p>In addition to equipment considerations the following safe operating procedures will be incorporated:</p> <ul style="list-style-type: none">- All personnel not directly supporting this operation will remain at least 25 feet from the point of operation.- Hydraulic masts or other projecting devices shall be at least 20 feet from overhead power sources and a minimum of 3 feet from underground utilities unless the exact location of the underground utility is known.- Hand signals will be established prior to the commencement of the operation.- Work areas will be kept clear of clutter.- Secure all loose articles to avoid possible entanglement.- All equipment shall be equipped with movement warning systems.- All personnel working in high equipment traffic areas are required to wear reflective vests for high visibility, and to establish unimpeded work areas around the operation. This activity may require areas of the building to be coordinated off during this operation.- All personnel will be instructed in the location and operations of the emergency shut off device(s) (if applicable). This device will be tested initially (and then periodically) to insure its operational status.- Areas will be inspected prior to the movement of DPT Rig and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SSO.- The DPT Rig and support vehicles will be moved no closer than 3 feet to floor openings, sidewalls, and excavations. <p>4) Hearing protection will be used during all DPT activities.</p> <p>5) All utility clearances shall be obtained prior to subsurface activities. Prior to any subsurface investigations, the locations of all underground utilities will be identified and marked. Obtain written permit clearance prior to all subsurface investigations. See Attachment V Utility Locating And Excavation Clearance of this HASP.</p> <p>6) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>7) Cuts and Lacerations – Employ the following measures to reduce and/or eliminate the potential for cuts and lacerations</p> <ul style="list-style-type: none">- Obtain and use the knife and acetate tube retention tub recommended by Geoprobe to prevent potential cuts and lacerations when accessing samples within MacroCore and Dual Tube Sampling System acetate liners. These items have been engineered to allow sample acquisition without putting the sampler at risk.- Select and secure the most favorable route to and from sampling locations.- Inspect all cutting equipment to be used to clear access routes for defects.- When cutting items - always use a sharp knife and always cut away from your body. Do not place items to be cut in your opposite hand or on your knee.- Carry all glassware and items that present a potential for cuts, lacerations, or impalement such as machetes or brush hooks in protective packaging or sheathed to avoid breakage or exposure in the event of a slip, trip, and/or fall. <p>8) Avoid nesting areas, use commercially available repellents. Report potential hazards to the SSO.</p> <p>9) Suspend or terminate operations until directed otherwise by SSO. Drink plenty of fluids and seek shelter (shade or air conditioned areas) for breaks. If necessary, evaluate workers for heat stress and follow ACGIH guidelines for work/rest regimens.</p>	<p>The primary contaminant of concern is lead which is a solid. Although not anticipated, any generation of dusts should be minimized to the greatest extent possible to avoid inhalation of lead contaminated dusts or particulates. Evaluation of dust concentrations will be qualitative by observing work conditions for visible dust clouds or accumulations. Potential exposure to contaminants attached to dust particles will be controlled by using water to suppress dusts, by avoiding dust plumes, or by upgrading the level of protection. If airborne dusts are observed, immediatlly contact the PHSO for additional guidance and modification of this HASP. If necessary, particulare/aerosol monitoring devices and personnel exposure monitoring will be performed.</p> <p>An XRF will be used to analyze lead concentrations within soil. Note: This device has a low energy radiological source – only trained personnel will be permitted to use this device. All operations will be performed in accordance with manufacturer procedures.</p> <p>Where the utility clearance cannot be obtained in a reasonable period, or not located, intrusive activities shall proceed with extreme caution using passive detection methods described in Section 6.0 of the Utility Locating And Excavation Clearance procedure (Attachment V of this HASP).</p>	<p>All subsurface operations are to be initiated in Level D protection. Level D protection constitutes the following minimum protection</p> <ul style="list-style-type: none">- Standard field attire (Sleeved shirt; long pants)- Surgical style nitrile gloves (layered as necessary)- Steel toe safety shoes- Safety glasses- Hardhat- Hearing protection for high noise areas, as directed by the SSO.- <i>Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential exists for soiling work attire.</i>- <i>Reflective vest for high traffic areas</i> <p>Note: The Safe Work Permit(s) for this task (see Attachment III) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p>	<p>Personnel Decontamination will consist of a soap/water wash and rinse for outer protective equipment (boots, gloves, coveralls, etc.). This function will take place at an area adjacent to the site activities. This procedure will consist of:</p> <ul style="list-style-type: none">- Equipment drop- Soap/water wash and rinse of outer boots and gloves- Soap/water wash and rinse of the outer splash suit, as applicable- Outer suit, boot covers, outer glove removal- Wash hands and face, leave contamination reduction zone <p>Equipment Decontamination – Typical macrocore decontamination:</p> <ul style="list-style-type: none">• Disassemble macrocore• Wash Cutting shoe and shell with soal and water• Rinse with potable water• Visually inspect to verify clean• Reassemble with new acetate liner <p>All heavy equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. Heavy equipment such as DPT Rig, will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will be restricted access to exclusion zones, or also have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity.</p> <p>All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site. The FOL or the SSO will be responsible for evaluating equipment arriving onsite and that which is to leave the site. No equipment will be authorized access or exit without this authorization.</p> <p>Evaluation will consist of</p> <ul style="list-style-type: none">- Visual inspection- Scanning equipment with monitoring instruments

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR
NAVAL AIR STATION, KEY WEST, FLORIDA

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment <i>Italicize text represents optional equipment to be worn when conditions require.</i>	Decontamination Procedures
<p>Confirmation soil sampling via direct collection (stainless steel bowls, trowels, etc.).</p> <p>These samples will be collected following soil excavation to confirm that all lead contaminated soil has been removed. Samples will be analyzed using XRF.</p>	<p>Chemical Hazards</p> <p>1) Lead is the primary contaminant of concern associated with the Truman Annex Water Tower Site. Confirmation sampling is not anticipated to bring site personnel into contact with significant concentrations of lead contaminated soil. However, excavation activities performed as part of the removal action may generate airborne dusts. Confirmation sampling does not require TtNUS personnel to continuouslyl work in areas where airborne dusts are present. Avoid any airborne dusts that may be created by excavation activities and station work areas upwind away from potential dusts. Observations of site dusts, will require area wetting methods to be implemented and further modification of this HASP.</p> <p>Further information on this contaminant is presented in Table 6-1.</p> <p>2) Transfer of contamination into clean areas</p> <p>Physical hazards:</p> <p>3) Noise 4) Lifting (muscle strains and pulls) 5) Heavy equipment hazards 6) Slip, trips, and falls 7) Natural hazards (Insect/animal bites and stings) 8) Inclement weather / heat stress</p>	<p>1) Avoid contact with potentially contaminated soils particulary dusts that may be generated as a result of excavation operations. Observations of airborne dust will require persons to move upwind and notification of the PHSO. Use safe work practices, PPE, and decontamination/personal hygiene practices to minimize potential exposures via incidental ingestion and skin contact.</p> <p>2) Decontaminate all equipment and supplies between sampling locations and prior to leaving the site.</p> <p>3) When sampling near operating heavy equipment or in the presence of elevated noise sources, use hearing protection. As a general rule of thumb, if you have to raise your voice to talk to someone who is within 2 feet of your location, noise levels may becoming excessive.</p> <p>4) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>5) Use high visibility reflective vest to improve visibility. Maintain two way visual contact with equipment operators and never work in an areas within the swing radius of excavator booms.</p> <p>6) Preview work locations for unstable/uneven terrain. Barricade all excavations and other associated drop off points at least 3 feet from the edge. Although deep excavations are not anticipated, site personnel will not be permitted to enter open excavations > 3 feet deep.</p> <p>7) Avoid nesting areas, use commerically available repellents. Report potential hazards to the SSO.</p> <p>8) Suspend or terminate operations until directed otherwise by SSO. Drink plenty of fluids and seek shelter (shade or air conditioned areas) for breaks. If necessary, evaluate workers for heat stress and follow ACGIH guidelines for work/rest regimens.</p>	<p>The primary contaminant of concern is lead which is a solid. Excavation operations performed as part of the removal action may generate airborne dusts. However TtNUS personnel performing confirmation sampling will not have to be present in areas where airborne dusts may exist. The generation of dusts should be minimized to the greatest extent possible to avoid inhalation of lead contaminated dusts or particulates. Evaluation of dust concentrations will be qualitative by observing work conditions for visible dust clouds or accumulations. If necessary potential exposure to contaminants attached to dust particles will be controlled by using water to suppress dusts, by avoiding dust plumes, or by upgrading the level of protection. If airborne dusts are observed, immediatlly contact the PHSO for additional guidance and modification of this HASP. If necessary, particulare/aerosol monitoring devices and personnel exposure monitoring will be performed.</p> <p>An XRF will be used to analyze lead concentrations within soil. Note: This device has a low energy radiological source – only trained personnel will be permitted to use this device. All operations will be performed in accordance with manufacturer procedures.</p>	<p>Level D protection will be utilized for the initiation of all sampling activities.</p> <p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none">- Standard field attire (sleeved shirt; long pants)- Surgical style nitrile gloves (layered as necessary)- Steel toe safety shoes- Safety glasses- Hardhat (when overhead hazards exists, or identified as a operation requirement)- Reflective vest for high traffic areas- <i>Hearing protection for high noise areas, or as required based on the noise level at each operation.</i>- <i>Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists.</i> <p>Note: The Safe Work Permit(s) for this task (see Attachment III) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p>	<p>Personnel Decontamination will consist of a soap/water wash and rinse for outer protective equipment (e.g. boots, gloves, coveralls, etc.). This function will take place at a satellite location. Disposable PPE will be bagged between sampling events. This procedure will consist of</p> <ul style="list-style-type: none">- Sample acquisition- Clean (Deionized water spray) the outside of the sample containers/label/bag <p>This decontamination procedure for Level D protection will consist of</p> <ul style="list-style-type: none">- Equipment drop- Soap/water wash and rinse of outer boots and outer gloves, as applicable- Soap/water wash and rinse of the outer splash suit, as applicable- Wash hands and face, leave contamination reduction zone
Mobilization/ Demobilization	<p>Chemical Hazards</p> <p>Site contaminants are not anticipated to be encountered during this activity. However, chemical hazards may be associated with chemicals that are brought on-site. Site personnel must maintain chemical inventories and manufacturer material safety data sheets (MSDS) and follow the TtNUS Hazard Communication Program in the Guidance Manual (Section 5.0).</p> <p>Physical Hazards:</p> <p>1) Lifting (muscle strains and pulls) 2) Slip, trips, and falls 3) Moving machinery 4) Natural hazards (Insect/animal bites and stings) 5) Vehicular and foot traffic</p>	<p>1) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques.</p> <p>2) Preview work locations for unstable/uneven terrain. Barricade all excavations from access closer than two feet from the edge.</p> <p>3) All equipment will be</p> <ul style="list-style-type: none">- Inspected in accordance with OSHA, and manufacturers design. (See Attachment VI of this HASP or Section 10.0 of the TtNUS Health and Safety Guidance Manual).- Operated by qualified operators, and knowledgeable ground crew. <p>4) Avoid nesting areas, use comerically available repellents. Report potential hazards to the SSO.</p> <p>5) Traffic and equipment considerations are to include the following:</p> <ul style="list-style-type: none">- Establish safe zones of approach (i.e. Boom + 3 feet).- Secure all loose articles to avoid possible entanglement.- All equipment shall be equipped with movement warning systems.- Employ safety belts and follow the site traffic rules. <p>Traffic patterns will be required supporting onsite activities. However, regulated patterns in and about the work zones and support thereof will be established to safely control moving equipment, vehicles, and pedestrians around the area of operation.</p>	Not required	<p>Level D - (Minimum Requirements)</p> <ul style="list-style-type: none">- Standard field attire (Sleeved shirt; long pants)- Steel toe safety shoes- <i>Safety glasses</i>- <i>Hardhat (when overhead hazards exists, or identified as a operation requirement)</i>- <i>Reflective vest for high traffic areas</i>- <i>Hearing protection for high noise areas, or as required based on the noise level at each operation.</i> <p>Note: The Safe Work Permit(s) for this task (see Attachment III) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p>	Not required

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR
NAVAL AIR STATION, KEY WEST, FLORIDA

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment <i>Italicize text represents optional equipment to be worn when conditions require.</i>	Decontamination Procedures
Decontamination of Sampling and Heavy Equipment	<p>Chemical Hazards:</p> <p>1) Lead is the primary contaminant of concern associated with the Truman Annex Water Tower Site. See Section 6.1 for information concerning the locations these concentrations occurred. Information concerning where higher levels of contaminants may be encountered should be listed on the Safe Work Permit.</p> <p>It is recommended that exposure (via ingestion due to hand to mouth contact) be minimized due to bio-accumulative properties of many of the contaminants. For more information on these contaminants, see Table 6-1.</p> <p>2) Decontamination fluids - Liquinox (detergent); isopropanol (decontamination solvent)</p> <p>Physical hazards:</p> <p>3) Lifting (strain/muscle pulls)</p> <p>4) Noise in excess of 85 dBA</p> <p>5) Flying projectiles</p> <p>6) Struck by</p> <p>7) Slips, trips, and falls</p> <p>Natural hazards:</p> <p>8) Inclement weather/heat stress</p>	<p>1) and 2) Employ protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Control potential non-occupational exposures through good work hygiene practices (i.e., avoid hand to mouth contact; wash hands and face before breaks and lunch; minimize contact with contaminated media). Obtain manufacturer's MSDS for any decontamination fluids used on-site. Solvents may only be used in well-ventilated areas, such as outdoors. Use appropriate PPE as identified on MSDS or within this HASP. All chemicals used must be listed on the Chemical Inventory for the site, and site activities must be consistent with the Hazard Communication Program provided in Section 5.0 of the TINUS Health and Safety Guidance Manual.</p> <p>3) Use multiple persons where necessary for lifting and handling heavy equipment for decontamination purposes.</p> <p>- Employ proper lifting techniques as described in Table 5-1, Mobilization/Demobilization.</p> <p>4) Wear hearing protection when operating the pressure washer and/or steam cleaner. Sound pressure levels measured during the operation of similar pieces of equipment indicate a range of 87 to 93 dBA.</p> <p>5) Use eye and face protective equipment when operating the pressure washer and/or steam cleaner, due to flying projectiles. All other personnel must be restricted from the area. In addition to minimize hazards (flying projectiles, water lacerations and burns) associated with this operation, the following controls will be implemented</p> <p>- A Fan Tip 25° or greater will be used on pressurized systems over 3,000 psi. This will reduce the possibility of water lacerations or punctures.</p> <p>- Thermostat control will be in place and operational to control the temperature levels of the water where applicable.</p> <p>- Visual evaluations of hoses and fittings for structural defects.</p> <p>- Construct deflection screens as necessary to control over-spray and to guard against dispersion of contaminants driven off by the spray.</p> <p>6) Struck by – Insure wash and drying racks are suitable construction to support heavier items such as necessary to protect against collapse during this process.</p> <p>7) The decontamination pad should be constructed to contain wash waters generated during decontamination procedures. Temporary decontamination pads are usually 10-30 mil polyethylene or polyvinyl chloride tarp construction and in this case may be a roll-off container.</p> <p>Polyethylene liners and PVC tarps when used as a liner offer containment, they also present a slipping hazard. When these temporary liners are employed, it is recommended that a light coating of sand be spread over the walking surface to provide traction.</p> <p>- In addition, adequate slope should be provided to the pad to permit drainage away from the object being cleaned. The collection point for wash waters should be of adequate distance that the decontamination workers do not have to walk through the wash waters while completing their tasks.</p> <p>- Hoses should be gathered when not in use to eliminate potential tripping hazards.</p> <p>8) Suspend or terminate operations until directed otherwise by SSO. Drink plenty of fluids and seek shelter (shade or air conditioned areas) for breaks. If necessary, evaluate workers for heat stress and follow ACGIH guidelines for work/rest regimens. .</p>	Use visual observation, to ensure all equipment has been properly cleaned of contamination and dried.	<p><i>For Heavy Equipment</i> This applies to high pressure soap/water, steam cleaning wash and rinse procedures.</p> <p>Level D Minimum requirements -</p> <p>- Standard field attire (Sleeved shirt; long pants)</p> <p>- Safety shoes (Steel toe/shank)</p> <p>- Chemical resistant boot covers</p> <p>- Nitrile outer gloves, cotton liners</p> <p>- PVC Rainsuits or PE or PVC coated Tyvek</p> <p>- Safety glasses underneath a splash shield</p> <p>For sampling equipment, the following PPE is required</p> <p>Level D Minimum requirements -</p> <p>- Standard field attire (Sleeved shirt; long pants)</p> <p>- Steel toe safety shoes</p> <p>- Nitrile outer gloves, cotton liners</p> <p>- Safety glasses underneath a splash shield</p> <p>In the event of overspray of chemical decontamination fluids use PVC Rainsuits or PE or PVC coated Tyvek as necessary.</p> <p>Note: The Safe Work Permit(s) for this task (see Attachment III) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p>	<p>Personnel Decontamination: This decontamination procedure for Level D protection will consist of:</p> <p>- Soap/water wash and rinse of outer gloves</p> <p>- Soap/water wash and rinse of the outer splash suit, as applicable</p> <p>- Wash hands and face, leave contamination reduction zone</p> <p>Equipment Decontamination - All heavy equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will be restricted access to exclusion zones, or also have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity.</p> <p>All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site.</p> <p>Evaluation will consist of</p> <p>- Visual inspection</p> <p>- Scanning equipment with monitoring instruments</p> <p>Sampling equipment will be decontaminated as per the requirements in the Sampling and Analysis Plan and/or Work Plan.</p> <p>MSDS for any decon solutions (Alconox, methanol, isopropanol, hexane, etc.) will be obtained and used to determine proper handling / disposal methods and protective measures (PPE, first-aid, etc.).</p> <p>The FOL or the SSO will be responsible for evaluating equipment arriving onsite and that which is to leave the site. No equipment will be authorized access or exit without this evaluation</p>

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR
NAVAL AIR STATION, KEY WEST, FLORIDA

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring/Type and Action Levels	Personal Protective Equipment <i>Italicize text represents optional equipment to be worn when conditions require.</i>	Decontamination Procedures
Surveying using GPS and Geophysical Surveying GPS Surveying will be conducted concurrently with sampling to identify sample locations and excavation boundaries.	<p>Chemical hazards:</p> <p>Exposure to potential site contaminants during surveying activities is unlikely given the nature of surveying work and the limited contact with potentially contaminated media. To further reduce the potential for exposure, site personnel performing surveying activities will minimize contact with potentially contaminated media and will avoid areas where chemical hazards may exist.</p> <p>Refer to Section 6.0 for a list of potential and representative site contaminants. See individual Safe Work Permits contained in Attachment III for specific contaminants of concern associated with particular sites and site activities.</p> <p>Physical hazards:</p> <p>1) Slip, trips, and falls</p> <p>2) Lifting (strain/muscle pulls)</p> <p>3) Natural hazards (Insect/animal bites and stings, poisonous plants)</p> <p>4) Inclement weather/heat stress</p>	<p>1) Preview work locations and site lines for uneven and unstable terrain. Clear necessary vegetation and establish temporary means for traversing hazardous terrain (e.g. rope ladders).</p> <p>2) Use multiple persons where necessary for lifting and handling heavy equipment for decontamination purposes.</p> <p>- Employ proper lifting techniques as described in Table 5-1, Mobilization/Demobilization.</p> <p>3) Avoid potential nesting areas of biting/stinging insects and animals. Use commercially available insect repellents. Avoid contact with poisonous vegetation. Wear appropriate clothing. Tape ankle and wrists areas to prevent ticks, chiggers, etc. from attaching themselves to your skin. Wear light-colored clothing so that ticks and other biting insects can be easily visible and be removed. If working in areas where snakes are a threat, wear snake chaps to protect against bites. Follow directions as specified in section 6.3 concerning natural hazards.</p> <p>4) All operations will be temporarily suspended during electrical storms. Drink plenty of fluids and seek shelter (shade or air conditioned areas) for breaks. If necessary, evaluate workers for heat stress and follow ACGIH guidelines for work/rest regimens.</p>	Not required	<p>Surveying activities shall be performed in Level D protection</p> <p>Level D Protection consists of the following:</p> <ul style="list-style-type: none">- Standard field dress including sleeved shirt and long pants- Steel-toe work boots or shoes- <i>Safety glasses, hard hats (if working near machinery)</i>- <i>Tyvek coveralls may be worn to provide additional protection against poisonous plants and insects, particularly ticks.</i>- <i>Work gloves may be worn if desired.</i>- <i>Snake chaps for heavily wooded area where encounters are likely.</i> <p>Note: The Safe Work Permit(s) for this task (see Attachment III) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.</p>	<p>Personnel Decontamination will consist of a soap/water wash and rinse for outer protective equipment (e.g. boots, gloves, coveralls, etc.). This function will take place at a satellite location. Disposable PPE will be bagged between sampling events. This procedure will consist of</p> <ul style="list-style-type: none">- Sample acquisition- Clean (Deionized water spray) the outside of the sample containers/label/bag <p>This decontamination procedure for Level D protection will consist of</p> <ul style="list-style-type: none">- Equipment drop- Soap/water wash and rinse of outer boots and outer gloves, as applicable- Soap/water wash and rinse of the outer splash suit, as applicable- Wash hands and face, leave contamination reduction zone

6.0 HAZARD ASSESSMENT

The following section provides information regarding the chemical, physical, and natural hazards associated with the sites of interest and the proposed site activities. Table 6-1 provides information related to primary contaminants of concern that have been identified through analysis and interpretation of available analytical data from previous site investigations. Specifically, toxicological information, exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data are discussed in the table.

6.1 CHEMICAL HAZARDS

Historical information and data from previous site investigations have determined the presence of lead contamination in soils on a parcel of land that surrounded the previous water tower. Lead is a potent, systemic poison that affect a variety of organ systems, including the nervous system, kidneys, reproductive system, blood formation, and gastrointestinal (GI) system. The most likely way enters the body is through inhalation, but it can also be ingested when lead dust or unwashed hands contaminate food, drink, or cigarettes. Much of ingested lead passes through feces without absorption into the body. Adults may absorb only 5 to 15% of ingested lead, children may absorb a much larger fraction. Once in the body, lead enters the bloodstream and circulates to various organs. Lead concentrates and remains in bone for many years. The amount of lead the body stores increases as exposure continues, with possibly cumulative effects. Depending on the dose entering the body, lead can be deadly within several days or affect health after many years. Very high doses can cause brain damage (encephalopathy).

The tasks TtNUS and subcontractor personnel will be performing present limited potential for exposure given the fact that DPT and associated sampling activities do not typical create significant amounts of airborne dusts. Exposures via other routes (incidental ingestion, skin contact) will be minimized through the use of safe work practices, PPE, decontamination and personal hygiene practices (washing hands and face prior to performing hand to mouth activities). The greatest potential for exposure to lead is anticipated to occur when TtNUS personnel collect confirmation soil samples during excavation activities performed by another contractor. Excavation activities may result in the generation of airborne dusts that may be inhaled or otherwise ingested. However, confirmation soil sampling activities do not require TtNUS personnel to be in close proximity to excavation operations where potential exposures may occur. Furthermore, TtNUS site personnel can situate themselves in an upwind area that will not be impacted by potential airborne dusts. To the extent possible, efforts will be made to coordinate sampling and excavation activities so that they are not performed simultaneously. Based on available analytical data that indicate the highest previous lead concentration in soil to be 8,260 milligrams per kilogram (mg/kg), airborne concentrations of dust greater than 3.0 milligrams per cubic meter (mg/m³) may result in

exposures to lead that approach the OSHA Time-Weighted Average (TWA) Permissible Exposure Limit (PEL) of 50 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Dusts are typically visually perceptible at an airborne concentration of approximately $2.5 \text{ mg}/\text{m}^3$. As a result, TtNUS personnel can prevent potential exposures to lead via inhalation by avoiding visible dusts and using area wetting to control airborne dusts.

6.2 PHYSICAL HAZARDS

The physical hazards that may be present during the performance of site activities are summarized below:

- Slips, trips, and falls
- Lifting (strain/muscle pulls)
- Noise in excess of 85 decibels on the A-weighted scale (dBA)
- Heavy equipment hazards (pinch/compression points, struck by hazards, rotating equipment, etc.).
- Energized systems (contact with underground or overhead utilities)
- Heat Stress (Ambient temperature extremes)

These physical hazards are discussed in Table 5-1 as applicable to each site task. Further, many of these hazards are discussed in detail in Section 4.0 of the Health and Safety Guidance Manual. Specific discussions on some of these hazards are presented below.

6.2.1 Slip, Trip and Fall Hazards

Various potential slip, trip and fall hazards may be encountered during the performance of planned site activities. These hazards are associated with working outdoors where uneven or wet terrain may be encountered. To minimize the potential for worker injury from these hazards, the following requirements must be observed:

- Maintain proper housekeeping in work areas. Stage DPT tooling and equipment, wrap up hoses at the decontamination area when not in use, construct the decontamination pad to drain to one end to avoid standing water.
- Preview and inspect work areas to identify and eliminate slip, trip, or fall hazards. In outdoor locations, pay particular attention to sink holes or other depressions that may be encountered. Ensure steps leading to the trailer have non-skid coatings on the tread areas. When constructing temporary decontamination facilities, care should be taken when using polyethylene sheeting or tarps

to contain wash waters. These surfaces can become extremely slippery. Where necessary, apply a light coating of sand to provide necessary traction.

- Any work that is to be done on structures that are more than 6-feet above floor or ground level will require fall protection training and the use of 100% fall protection equipment.
- Cover, guard, barricade, and or place warning postings over/at holes, openings, or excavations that personnel may fall into or step into. Stairs leading to elevated structures (such as a trailer or elevated work platform greater than 4-feet shall be protected by handrails in accordance with OSHA 29 CFR 1910.23.
- Use footwear with adequate traction.
- Prepare work areas by removing tripping hazards (ruts, roots, debris). This is especially critical concerning approach pathways leading to or around heavy equipment.

6.2.2 Strains/Muscle Pulls

This hazard potential is greatest during mobilization/demobilization activities or when handling sampling coolers when most of the physical lifting is accomplished.

Worker injuries resulting from improper manual material handling activities are easily prevented through observation of proper lifting and carrying methods. These types of injuries are not limited to merely the factor of the weight of the load. Other considerations include:

- How many lifts will be involved (i.e., repetitive lifting of even small loads),
- The size, shape, and/or configuration of the load to be lifted,
- Whether or not the load will need to be lifted to another height or carried to another location,
- The area available to maneuver the lift.

Workers involved with these types of activities are to be instructed by the SSO in the following manner:

- First estimate the weight and configuration of the load. This means determine if it is too bulky or hard to safely grasp/lift/control alone. If so, either use a mechanical lifting device or obtain help from

another employee to lift the load. (Note: The use of mechanical lifting devices is always preferable over manual lifting).

- Bend at the knees (not at the waist) when attempting a lift.
- Ensure that a firm hold is obtained, and keep the load as close to the body as possible.
- Lift the load using your legs, and not the back.
- Avoid turning or twisting while holding a load.
- If the load is to be moved, preview the path of travel first to identify and eliminate any tripping hazards.
- Do not attempt to carry loads that obstruct the line of sight.
- When setting a load down, again use the leg muscles and do not bend at the waist.
- Take rest breaks as necessary to prevent fatigue and injury.

You are most vulnerable to hazards of this nature early in the day prior to limbering and stretching and late in the day due to fatigue. Additional care should be exercised during these periods.

6.2.3 Noise in Excess of 85 dBA

Worker exposure to noise that can approach hazardous levels is a common hazard on most project work sites. Workers who must work in areas or who must perform operations where noise levels can approach an 8-hour time weighted average of 85 decibels on the A-weighted scale (dBA) must have received hearing conservation training within the past 12 month period (this is normally provided as part of the 8-hour refresher training). If personnel have not had this training within the last twelve months they will be provided such training by the SSO at the project site prior to participating in high noise level activities. On this project, high noise levels may be encountered when working near the DPT rig or excavators, and during decontamination operations when using a pressure washer,

As a general rule-of-thumb to prevent worker exposure to high noise levels, workers will be informed to observe the following:

If ambient noise levels are loud enough that they have to raise their voice in order to communicate with another person who is less than 2 feet away, hearing protection will be required.

Also, if any existing base operations are posted as high noise areas or that hearing protection is required in that area, then hearing protection will be used.

Site boundaries for exclusion zone demarcation have included sufficient distances to accommodate potential noise hazards associated with the identified operations.

Hearing protection will be the primary control measure for personnel who must work within the vicinity of excessive noise levels. Those activities anticipated to have excessive noise levels have been identified in Table 5-1.

6.2.4 Exposure to Pinch or Compression Points and/or Entanglement or Contact with Moving or Rotating Equipment/Machinery

Moving and operating machinery present potential hazards of entanglement, caught in or between, and/or to be struck by machines or machine parts. Hazards of this nature are considered a predominant hazard associated with DPT and excavation operations. Many of the recorded fatalities within the construction industry have been associated with entanglement or contact with heavy machinery. Recognition and control shall focus on identification to minimize these risks. The following measures shall be instituted

- Equipment that is to be operated must first be closely inspected to ensure that adequate machine guarding is in place.
- No maintenance or other activities are to be performed on operating machines. Also, employees whose duties places them in proximity to moving machinery items are to avoid wearing jewelry, or have long (unrestricted) hair, or loose fitting clothing that could become entangled in rotating equipment.
- Also, the use of home-made or jury-rigged machine parts is strictly prohibited. Equipment parts must be manufacturer-provided or approved.

In addition, to further minimize hazards of this nature and as this activity shall take place within a light industrial area, the following additional precautions shall be employed:

Traffic Patterns in and around the DPT/excavation area – Traffic for heavy equipment and pedestrians shall be separated by flow patterns. Heavy equipment (DPT rigs, excavators, and support vehicles) shall be routed in a singular direction to minimize backing, U-turns, and other maneuvers that could result in an accident. A demarcation area shall be established in plain view, so personnel recognize the boundary of potential physical hazards. Boundaries established to control hazards of this nature are as follows:

- DPT Operations – Establish an exclusion zone equal to the height of the mast plus five feet. Non-essential personnel will be restricted from being within this area.

The positioning of DPT rig and support vehicles will utilize a ground spotter. Flag persons, barriers, and high visibility vests will be used in areas where operations may impede or impact vehicle and/or pedestrian traffic, to provide visual recognition and control of the work zone.

6.2.5 Contact with Energized Sources, Including Operating Processes and Utilities **(Aboveground and Underground)**

Contact with energized sources can result in severe injury and even death. There are two areas of concern with this potential hazard: contact with energized processing equipment and contact with energized utilities including underground utilities (including electrical transmission lines, gas lines, water lines, etc.) and overhead utilities (i.e., power lines).

To protect against the first concern, contact with energized processing equipment, any work on or near these types of items will be required to follow the Company Safe Work Practice on the Control of Hazardous Energy Sources (Lockout/Tag out).

Contact with Energized Systems – Much of the work to be done at the facility will be within light industrial areas that may be serviced by underground and overhead energy sources. Preliminary efforts to control hazards of this nature will include:

- Use and application of Attachment V, Standard Operating Procedure (SOP) for Utility Locating and Excavation Clearance. This procedure provides step by step instructions for clearance of underground utilities, as well as, avoidance techniques, and required documentation.
- Establishing a suitable clearance distance (20-feet) from overhead utilities will be the primary method to control hazards conveyed through contact with these power sources.

TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NAS KEY WEST, KEY WEST FLORIDA

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Lead	7439-92-1	Particulate form - Unable to be detected by either PID or FID.	Air sample using a mixed cellulose ester filter; or HNO ₃ or H ₂ O ₂ desorption; or Atomic absorption detection. NIOSH Method #7082 or #7300.	OSHA: 0.05 mg/m ³ ACGIH: 0.05 mg/m ³ NIOSH: 0.10 mg/m ³ IDLH: 100 mg/m ³ as lead	The use of an air purifying, full-face respirator with high efficiency particulate air filter for up to 2.5 mg/m ³ . Recommended gloves: This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	Boiling Pt: 3164°F; 1740°C Melting Pt: 621°F; 327°C Solubility: Insoluble Flash Pt: Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) LEL/LFL: Not applicable UEL/UFL: Not applicable Vapor Density: Not available Vapor Pressure: 0 mmHg Specific Gravity: 11.34 Incompatibilities: Strong oxidizers, peroxides, sodium acetylide, zirconium, and acids Appearance and Odor: Metal: A heavy ductile, soft gray solid.	Overexposure to this substance via ingestion or inhalation may result in metallic taste in the mouth, dry throat, thirst, Gastrointestinal disorders (burning stomach pain, nausea, vomiting, possible diarrhea sometimes bloody or black, accompanied by severe bouts of colic), CNS effects (muscular weakness, pain, cramps, headaches, insomnia, depression, partial paralysis possibly coma and death. Extended exposure may result in damage to the kidneys, gingival lead line, brain, and anemia.

6.3 NATURAL HAZARDS

Insect/animal bites and stings, inclement weather, and other natural hazards must be considered given the location of activities to be conducted. In general, avoidance of areas of known infestation or nesting will be the preferred exposure control. Use of additional PPE with joints (ankles and wrists) taped, such as long pants tucked into boots or coveralls, is also recommended. Specific discussion on principle hazards of concern follows:

6.3.1 Fire Ants

Fire ants present a unique situation when working outdoors in Florida. Their aggressive behavior and their ability to sting repeatedly can pose a unique health threat. The sting injects venom that causes an extreme burning sensation. Pustules form which can become infected if scratched. Allergic reactions of people sensitive to the venom include dizziness, swelling, shock and in extreme cases unconsciousness and death. People exhibiting such symptoms should be taken for immediate medical evaluation.

Fire ants can be identified by their habitat. They build mounds in open sunny areas sometimes supported by a wall or shrub. The mound has no external opening. The size of the mound can range from a few inches across to some which are in excess of two feet or more in height and diameter. When disturbed they defend it by swarming out and over the mound, even running up grass blades and sticks.

6.3.2 Snakes, Insects, and Other Animals

The site is suspected of supporting a large population of eastern diamondback rattlesnakes. Given that areas to be investigated could be prime nesting and/or hiding locations for snakes and insects, precautions will be taken when opening manholes and other access doors. When possible, doors and manhole covers will be opened away from personnel to allow snakes or insects to escape. Personnel should avoid reaching into areas that are not visibly clear of snakes or insects. Snake chaps will be worn in areas of known or anticipated snake infestation. All site personnel who are allergic to stinging insects such as bees, wasps, and hornets must be particularly careful since severe illness and death may result from allergic reactions. As with any medical condition or allergy, information regarding the condition must be listed on the Medical Data Sheet and the FOL and SSO notified.

There are various areas throughout the U.S. where Lyme Disease is endemic. Fortunately, Florida is not one of these areas. Nonetheless, personnel should be aware of the hazards of tick bites, Lyme Disease, and Southern Tick Associated Rash Illness (STARI). The longer a disease carrying tick remains attached to the body, the greater the potential for contracting the disease. Wearing long sleeved shirts and long pants (tucked into boots). As well as performing frequent body checks will prevent long term attachment.

Site first aid kits should be equipped with medical forceps and rubbing alcohol to assist in tick removal. For information regarding tick removal procedures, and symptoms of exposure consult Section 4.0 of the Health and Safety Guidance Manual.

An Office of Natural Resources or similar entity on Base should be contacted for further direction on the hazards and precautions of naturally occurring wildlife and insects.

6.3.3 Inclement Weather

Project tasks under this Scope of Work will be performed outdoors. As a result, inclement weather may be encountered. In the event that adverse weather conditions arise (electrical storms, hurricanes, etc.), the FOL and/or the SSO will be responsible for temporarily suspending or terminating activities until hazardous conditions no longer exist.

6.3.4 Heat Stress

Given the geographic location of the site and the project schedule, overexposure to high ambient temperatures (heat stress) may exist during performance of this work depending on the project schedule. Work performed when ambient temperatures exceed 70 °F may result in varying levels of heat stress (heat rash, heat cramps, heat exhaustion, and/or heat stroke) depending on variables such as wind speed, humidity, and percent sunshine, as well as physiological factors such as metabolic rate and skin moisture content. Additionally, work load and level of protective equipment will affect the degree of exposure. Site personnel will be encouraged to drink plenty of fluids to replace those lost through perspiration. Additional information such as Work-Rest Regimens and personnel monitoring may be found in Section 4.0 of the Health & Safety Guidance Manual. Heat stress monitoring will be conducted at the SSO's discretion.

Many of these physical hazards are discussed in detail in Section 4.0 of the Health and Safety Guidance Manual. Additional information regarding physical hazards associated with the site is provided in Table 5-1 of this HASP.

7.0 AIR MONITORING

Direct read air monitoring instruments are not anticipated to be necessary for site work since the primary contaminant of concern is lead and airborne concentrations of dusts at levels that are capable of producing an exposure above the OSHA PEL are unlikely. However other monitoring instrumentation including an x-ray fluorescence (XRF) will be used to evaluate lead concentrations in soil. Additionally, if airborne dusts are determined to be a problem, a direct read particulate/aerosol monitor will be used to ensure airborne dusts do not reach concentrations that are capable of causing an exposure. If the use of such a device is determined to be necessary or if the scope of work changes, this HASP will be modified accordingly to include procedures for use, frequency of use, calibration requirements, and appropriate action levels.

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

This section is included to specify health and safety training and medical surveillance requirements for TtNUS personnel participating in site activities.

All TtNUS personnel must complete 40 hours of introductory hazardous waste site training prior to performing work at NAS Key West. Additionally, TtNUS personnel who have had introductory training more than 12 months prior to site work must have completed 8 hours of refresher training within the past 12 months before being cleared for site work. In addition, 8-hour supervisory training in accordance with 29 CFR 1910.120(e)(4) will be required for site supervisory personnel. Documentation of TtNUS introductory, supervisory, and refresher training as well as site-specific training will be maintained at the project. Copies of certificates or other official documentation will be used to fulfill this requirement.

TtNUS will conduct a pre-activities training session prior to initiating site work. Additionally, a brief meeting will be held daily to discuss operations planned for that day. At the end of the workday, a short meeting will be held to discuss the operations completed and any problems encountered. This activity will be supported through the use of a Safe Work Permit System (See Section 9.2).

8.1.1 Requirements for Subcontractors

Identified TtNUS subcontractor personnel must have completed introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120(e) and 8 hours of refresher training meeting the requirements of 29 CFR 1910.120(e)(8) prior to performing field work at the NAS Key West. TtNUS subcontractors must certify that each employee has had such training by sending TtNUS a letter, on company letterhead, containing the information in the example letter provided in Figure 8-1. This letter will be accompanied by training certificates or some other form of official documentation for all subcontractor personnel participating in site activities.

8.2 SITE-SPECIFIC TRAINING

TtNUS will provide site-specific training to all site personnel who will perform work on this project. Site-specific training will also be provided to all personnel [U.S. Department of Defense (DOD), EPA, etc.] who may enter the site to perform functions that may or may not be directly related to site operations. Site-specific training will include:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment
- Work practices to minimize risks from hazards
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Spill response procedures
- Review of the contents of relevant Material Safety Data Sheets

Site-specific documentation will be established through the use of Figure 8-2. All site personnel and visitors must sign this document upon receiving site-specific training.

8.3 MEDICAL SURVEILLANCE

All TtNUS personnel participating in project field activities will have had a physical examination meeting the requirements of TtNUS's medical surveillance program and will be medically qualified to perform hazardous waste site work using respiratory protection. Documentation for medical clearances will be maintained in the TtNUS Pittsburgh and/or Aiken offices and made available as necessary.

Each field team member and visitor entering the Exclusion Zone(s) shall be required to complete and submit a copy of Medical Data Sheet presented in Figure 8-4. This shall be provided to the SSO prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.3.1 Medical Surveillance Requirements for Subcontractors

Identified subcontractors are required to obtain a certificate of their ability to perform hazardous waste site work and to wear respiratory protection. The "Subcontractor Medical Approval Form" provided in Figure 8-3 shall be used to satisfy this requirement, providing it is properly completed and signed by a licensed physician.

Subcontractors who have a company medical surveillance program meeting the requirements of paragraph (f) of OSHA 29 CFR 1910.120 can substitute "Subcontractor Medical Approval Form" with a

letter, on company letterhead, containing all of the information in the example letter presented in Figure 8-3 of this HASP.

8.3.2 Requirements for All Field Personnel

Each field team member (including subcontractors) and visitors entering the Exclusion Zone(s) shall be required to complete and submit a copy of Medical Data Sheet found in the TtNUS Health and Safety Guidance Manual. This shall be provided to the SSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.4 SUBCONTRACTOR EXCEPTIONS

The use of the subcontractor exception is strictly limited to the authority of the CLEAN Health and Safety Manager.

In situations in which the exclusion zone is not entered or when there is no potential for exposure to site contaminants, subcontractor personnel may be exempt from some of the training and medical surveillance requirements. All subcontractors and visiting personnel are required to receive site-specific training (as discussed in Section 8.2) regarding information provided in this HASP. Examples of subcontractors who may be exempt from training and medical surveillance requirements may include surveyors who perform surveying activities at the site perimeters or in areas where there is no potential for exposure to site contaminants, and in this case the subcontractor providing concrete coring services.

Figure 8-1
Example Training Letter

The following statements must be typed on company letterhead and signed by an officer of the company and accompanied by copies of personnel training certificates:

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

Mr. Charles Bryan
Task Order Manager
Tetra Tech NUS, Inc.
900 Trail Ridge Road
Aiken, South Carolina 29803

Subject: HAZWOPER Training for Naval Air Station Key West, Florida

Dear Mr. Bryan:

As an officer of XYZ Corporation, I hereby state that I am aware of the potential hazardous nature of the subject project. I also understand that it is our responsibility to comply with all applicable occupational safety and health regulations, including those stipulated in Title 29 of the Code of Federal Regulations (CFR), Parts 1900 through 1910 and Part 126.

I also understand that Title 29 CFR 1910.120, entitled "Hazardous Waste Operations and Emergency Response," requires an appropriate level of training for certain employees engaged in hazardous waste operations. In this regard, I hereby state that the following employees have had 40 hours of introductory hazardous waste site training or equivalent work experience as requested by 29 CFR 1910.120(e) and have had 8 hours of refresher training as applicable and as required by 29 CFR 1910.120(e)(8) and that site supervisory personnel have had training in accordance with 29 CFR 1910.120(e)(4).

LIST FULL NAMES OF EMPLOYEES AND THEIR SOCIAL SECURITY NUMBERS HERE.

Should you have any questions, please contact me at (555) 555-5555.

Sincerely,

(Name and Title of Company Officer)

Figure 8-2
Site-Specific Training Documentation

My signature below indicates that I am aware of the potential hazardous nature of performing quarterly groundwater sampling activities at NAS Key West in Key West, Florida, and that I have received site-specific training that included the elements presented below:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment
- Work practices to minimize risks from hazards
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Spill response procedures
- Review of contents of relevant Material Safety Data Sheets

I have been given the opportunity to ask questions and all of my questions have been answered to my satisfaction. The dates of my training and medical surveillance indicated below are accurate.

[illegible]

Figure 8-3
Subcontractor Medical Approval Form
Page 1 of 2

For employees of _____
Company Name

Participant Name: _____ Date of Exam: _____

Part A

The above-named individual has:

1. Undergone a physical examination in accordance with OSHA Standard 29 CFR 1910.120, paragraph (f) and found to be medically -

☐ qualified to perform work at the NAS Key West work site
☐ not qualified to perform work at the NAS Key West work site

and,
2. Undergone a physical examination as per OSHA 29 CFR 1910.134(b)(10) and found to be medically -

☐ qualified to wear respiratory protection
☐ not qualified to wear respiratory protection

My evaluation has been based on the following information, as provided to me by the employer.

- ☐ A copy of OSHA Standard 29 CFR 1910.120 and appendices.
- ☐ A description of the employee's duties as they relate to the employee's exposures.
- ☐ A list of known/suspected contaminants and their concentrations (if known).
- ☐ A description of any personal protective equipment used or to be used.
- ☐ Information from previous medical examinations of the employee which is not readily available to the examining physician.

Part B

I, _____, have examined _____

Physician's Name (print)

Participant's Name (print)

and have determined the following information:

Figure 8-3
Subcontractor Medical Approval Form
Page 2 of 2

1. Results of the medical examination and tests (excluding finding or diagnoses unrelated to occupational exposure):

2. Any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health:

3. Recommended limitations upon the employee's assigned work:

I have informed this participant of the results of this medical examination and any medical conditions which require further examination or treatment.

Based on the information provided to me, and in view of the activities and hazard potentials involved at the NAS Key West work site, this participant

() may

() may not

perform his/her assigned task.

Physician's Signature _____

Address _____

Phone Number _____

NOTE: Copies of test results are maintained and available at:

Address

9.0 SITE CONTROL

Site operations and control will be facilitated through the use of established work zones and security and control of those zones. These activities will minimize the impact and spread of contaminants brought to the surface through demolition and excavation methods as well as protect personnel and visitors within these zones during ongoing operations.

9.1 WORK ZONES

Tetra Tech NUS will delineate and use work zones in conjunction with decontamination procedures to prevent the spread of contaminants to other areas of the site. A three-zone approach will be used for work at this site; an Exclusion Zone, a Contamination Reduction Zone, and a Support Zone. These will be used to control access to the work areas, restricting the general public, avoiding potentials to spread any contaminants, and to protect individuals who are not cleared to enter by way of training and/or medical surveillance qualifications.

9.1.1 Exclusion Zone

An Exclusion Zone will be established at each location where intrusive site work will be performed. The purpose of an exclusion zone is to define an area where specified requirements and restrictions must be observed (such as PPE usage, restrictions against smoking/eating etc.). These are areas that could be adversely impacted by either chemical or physical hazards. Exclusion Zone sizes and dimensions can vary based on various factors, such as:

- The nature of planned activities and the size of the area needed to safely perform them
- Physical and topographical features of the site
- Weather conditions
- Field and analytical measurements of air and environmental contaminants
- Air dispersion calculations
- Physical, chemical and toxicological properties of the contaminants being investigated

The following dimensions are to be observed for establishing the initial size of Exclusion Zones for this project:

- Monitoring well sampling and subsurface soil sampling: The exclusion zone for this activity will be set at 10 feet surrounding the sampling point (boring or well head and discharge collection container).

- DPT operations and delineation sampling: A distance equal to the height of the mast plus 5 feet or a distance no less than 25 feet surrounding the DPT operation.
- Confirmation sampling: The exclusion zone for this activity will be set at 10 feet surrounding the personnel and sampling equipment.
- Decontamination operation. The exclusion zone for this activity will be set at 10 feet surrounding the personnel and sample equipment decontamination wash and rinse.

All exclusion zones shall remain marked until the SSO has evaluated the restoration effort and has authorized changing the zone status.

Exclusion zones will be marked using fencing, barrier tape, traffic cones and/or drive poles. Signs will be posted to inform and direct site personnel and site visitors.

9.1.2 Contamination Reduction Zone

The contamination reduction zone will be split to represent two separate functions. The first function will be a control/supply point for supporting exclusion zone activities. The second function, which may take place a sufficient distance from the exclusion zone is the decontamination of personnel and sampling equipment.

In order to move from the exclusion zone to a separate location the following activities will be used:

- As samplers move from location to location during sampling activities, dedicated sampling devices and PPE will be washed of gross contamination, removed, separated, and bagged. Personnel will use hygienic wipes, such as Handy Wipes, as necessary for personnel decontamination until they can access the centralized decontamination unit. At the first available opportunity personnel will wash their face and hands. This is also true prior to breaks and lunch when contamination can be transferred to the mouth through hand to mouth contact. This route of exposure is estimated to have the greatest and most likely potential for exposure to the contaminants of concern.
- Muddy over-boots and gloves may be required to go through a gross contamination wash at the exclusion zone. These items will then be cleaned thoroughly at the centralized decontamination unit.

- Potentially contaminated tooling along with PPE will be wrapped, when necessary, for transport to the decontamination area.
- Upon completion of the assigned tasks all personnel will move through the central decontamination area to clean reusable PPE and field equipment. Based on ambient conditions medical evaluations may take place at the termination point of the decontamination line. These evaluations will include pulse rate, oral temperature, and breathing rate to evaluate physiological demands on site personnel. As stated earlier, these evaluations will be based on ambient conditions and acclimation periods.

9.1.3 Support Zone

The Support Zone will consist of a field trailer, storage, lay-down areas, or some other uncontaminated, controlled point. The Support Zone for this project will include a staging area where site vehicles can be parked, equipment will be unloaded, and where food and drink containers will be maintained. In all cases, the support zones will be established in clean areas of the site.

9.2 SAFE WORK PERMITS

All Exclusion Zone work and certain support tasks conducted in support of this project will be performed using Safe Work Permits to guide and direct field crews on a task by task basis. Partially completed Safe Work Permits have been prepared for each of the planned tasks and are included in Attachment III of this HASP. The SSO is responsible for completing the remaining portions of these permits, and for reviewing them with all task participants as part of daily task-specific tailgate meetings. A blank Safe Work Permit is included in Figure 9-1 as an example.

The use of these permits will ensure that site-specific considerations and changing conditions are incorporated and addressed into the field activities. All Safe Work Permits will require the signatures of either the FOL or the SSO, as well as the signature of a representative of any subcontractors that will participate in the task (when appropriate). All personnel that will be engaged in on-site activities must be made aware of the contents of the appropriate Safe Work Permits before participating in any of the covered tasks. If additional tasks become necessary, the PHSO is to be notified so that this HASP can be appropriately reviewed/modified and to help prepare the necessary Safe Work Permit(s).

The use of these permits will establish and provide for reviewing protective measures and hazards associated with each operation. This HASP will be used as the primary reference for selecting levels of

protection and control measures. The Safe Work Permit will take precedence over the HASP when more conservative measures are required based on specific site conditions.

Upon completion of the work for which the Safe Work Permit was assigned, the Safe Work Permit will be turned into the FOL or the SSO. Concerns, complaints, and suggestions may be made on the reverse of the Safe Work Permit for consideration by the FOL and/or the SSO. All permits turned in with suggestions, difficulties, or complaints are to be forwarded to the PHSO for review.

9.3 SITE MAP

Once the areas of contamination, access routes, topography, dispersion routes are determined, a site map will be generated and adjusted as site conditions change. This map will be posted to illustrate up-to-date information of contaminants and adjustment of zones and access points. This map will be posted at the field support trailer or other centralized location. Figure 2-1 in the Work Plan will serve as the preliminary version until investigation reveals more information. A map of the base is included in this HASP in Figure 9-2.

9.4 BUDDY SYSTEM

Personnel engaged in on-site activities will practice the "buddy system" to ensure the safety of all personnel involved in this operation.

9.5 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

Tetra Tech NUS and subcontractor personnel will provide MSDSs for all chemicals brought on-site. The contents of these documents will be reviewed by the SSO with the user(s) of the chemical substances prior to any actual use or application of the substances on-site. The MSDSs will be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request. The SSO will be responsible for implementing a site-specific Hazard Communication Program (See Section 5.0 of the TtNUS Health and Safety Guidance Manual). This includes collection of MSDSs, creation and maintenance of an accurate Chemical Inventory Listing, container labeling and personnel training issues, and other aspects of Hazard Communication.

**FIGURE 9-1
SAFE WORK PERMIT**

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope (To be filled in by person performing work)

- I. Work limited to the following (description, area, equipment used): _____
- II. Names: _____
- III. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____
- TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

- | | |
|---|--|
| IV. Protective equipment required | Respiratory equipment required |
| Level D <input type="checkbox"/> Level B <input type="checkbox"/> | Full face APR <input type="checkbox"/> Escape Pack <input type="checkbox"/> |
| Level C <input type="checkbox"/> Level A <input type="checkbox"/> | Half face APR <input type="checkbox"/> SCBA <input type="checkbox"/> |
| | SKA-PAC SAR <input type="checkbox"/> Bottle Trailer <input type="checkbox"/> |
| | Skid Rig <input type="checkbox"/> None <input type="checkbox"/> |

Modifications/Exceptions: _____

V. Chemicals of Concern	Action Level(s)	Response Measures
-------------------------	-----------------	-------------------

_____	_____	_____
_____	_____	_____
_____	_____	_____

VI. Additional Safety Equipment/Procedures

- | | |
|---|--|
| Hardhat..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Chemical/splash goggles..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Radio <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Splash Shield..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Barricades..... <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Splash suit/coveralls (Type: _____) ... <input type="checkbox"/> Yes <input type="checkbox"/> No | Gloves (Type) <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe/shank Workboots..... <input type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen..... <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Chemical Protective Over-boots (Type: _____) <input type="checkbox"/> Yes <input type="checkbox"/> No | |

Modifications/Exceptions: _____

- | | | | | | |
|--|--------------------------|--------------------------|------------------------|--------------------------|--------------------------|
| VII. Procedure review with permit acceptors | Yes | NA | | Yes | NA |
| Safety shower/eyewash (Location & Use) | <input type="checkbox"/> | <input type="checkbox"/> | Emergency alarms..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Procedure for safe job completion | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes..... | <input type="checkbox"/> | <input type="checkbox"/> |
| Contractor tools/equipment inspected | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points | <input type="checkbox"/> | <input type="checkbox"/> |

- | | | | |
|---|--------------------------|--------------------------|--------------------------|
| VII. Site Preparation | Yes | No | NA |
| Utility Locating and Excavation Clearance completed | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Equipment and Foot Traffic Routes Cleared and Established | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Physical Hazards Barricaded and Isolated | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Equipment Staged | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- VIII. Additional Permits required (Hot work, confined space entry, excavation, etc.). ☐ Yes ☐ No
- If yes, See SSO for appropriate permit*

- IX. Special instructions, precautions: _____
- _____
- _____

Permit Issued by: _____ Permit Accepted by: _____

9.6 COMMUNICATION

It is anticipated that site personnel will be working in close proximity during proposed field activities. In the event that site personnel are in isolated areas or are separated by significant distances, a supported means of communication between field crews will be utilized. Two-way radio communication devices, if needed, will be used only with NAS Key West approval.

External communications may be accomplished utilizing telephones that have been/can be installed at predetermined and approved locations, or through cellular phones. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of site activities, the FOL will determine and arrange for appropriate means to accomplish external communications.

Switch off the phone when in any area with a potentially explosive atmosphere and obey all signals and instructions. Most manufacturers advised users to switch off the phone when at a refueling point. Do not use near fuels or chemicals or where blasting is in progress. Also, any restrictions or regulations in force at the base related to cellular phone use must be observed.

9.7 SITE VISITORS

Potential site visitors that may be encountered during the performance of the fieldwork could include the following:

- Personnel invited to observe or participate in operations by Tetra Tech NUS.
- Regulatory personnel (i.e., DOD, FDEP, EPA, OSHA, etc.)
- US Naval Personnel
- Other authorized visitors

All non-DOD personnel working on this project are required to gain initial access to the base by coordinating with the TtNUS PM or designee and following established base access procedures.

Once access to the base is obtained, all personnel who require access to Tetra Tech NUS work sites (areas of ongoing operations) will be required to obtain permission from the FOL and the Base Contact. Upon gaining access to the work site, all site visitors wishing to observe operations in progress will be required to meet the minimum requirements as stipulated below.

- All site visitors will be routed to the FOL, who will sign them into the field logbook. Information to be recorded in the logbook will include the individuals name (proper identification required), who they represent, and the purpose for the visit. **The FOL is responsible for ensuring that site visitors are escorted at all times.**
- All site visitors will be required to produce the necessary information supporting clearance on to the site. This includes information attesting to applicable training (40-hours of HAZWOPER, 8-Hour Refresher as applicable), and medical surveillance as stipulated in Section 8.4, of this document. In addition, to enter the sites operational zones during planned activities, all visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this HASP.

Once the site visitors have completed the above items they will be permitted to enter the site and applicable operational areas. All visitors are required to observe the protective equipment and site restrictions in effect at the work areas visited. Any and all visitors not meeting the requirements as stipulated in this plan for site clearance will not be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized site visitation will cause all on-site activities to be terminated until that visitor can be removed. Removal of unauthorized visitors will be accomplished with support from the Base Contact, if necessary. At a minimum, the Base Contact will be notified of any unauthorized visitors.

9.8 SITE SECURITY

As this activity will take place at a United States Naval facility, the first line of security will be provided by the base gate restricting the general public. The second line of security will take place at the work site referring interested parties to the FOL and Base Contact.

Security at the work areas will be accomplished using field personnel. This is a multiple person operation, involving multiple operational zones. Tetra Tech NUS personnel will retain complete control over active operational zones.

The Base Contact will serve as the focal point for base personnel and interested parties and will serve as the primary enforcement contact.

9.9 SANITATION AND BREAK AREAS

This section will address the following items:

- Toilets
- Potable water
- Showers and change rooms
- Break Areas

9.9.1 Toilets

One toilet will be provided for every 20 people. All toilets will be unisex and will have locking doors. The toilet provided will either be a chemical toilet or a flush toilet associated with an existing location.

9.9.2 Potable Water

Potable water as well as electrolyte balance sports drinks such as Gatorade will be provided to the field crews for fluid replacement. Storage and dispensing will proceed as follows:

- All containers will be clean and replenished daily.
- All containers will clearly marked as to their contents (Potable Water – Drinking Water Only; Gatorade, etc.).
- Dispensing locations will be placed in identified break areas within the support zone. The most likely location will be a break trailer. This will serve as an area for cooling or warming as well as an identified food and drink consumption area.
- If larger containers are used, dispensing cups will be provided.
- The coolers used for storage of potable drinks and cups will be stored away from potentially contaminating materials. Coolers used for shipping samples are not acceptable to store food or drink.

Fluid intake recommendations will be made based on the medical evaluations conducted at the end of the decontamination process, as necessary based on ambient conditions.

9.9.3 Showers/Change Rooms and Break Areas

Based on this scope and duration of this project shower facilities and locker rooms will not be provided.

Suitable locations will be provided for field personnel for the following use:

- Break areas for food and drink consumption
- Areas suitable for warming and cooling regimens
- Areas suitable for Safety Meetings

This location will be either the project trailer, or its own separate trailer based on the crew size. This area will be climate control to provide suitable shelter to combat heat or cold stress.

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

It is not anticipated that bulk hazardous materials (over 55-gallons) will be accumulated or handled as part of the scope of work. It is also not anticipated that spillage of stored materials would constitute a danger to human health or the environment. Prior remediation activities have disturbed and homogenized the surface soil at the water tower site. Any soil IDW that is generated will be placed back into the sample excavation at each respective sampling location. Decontamination fluids, and disposable PPE, and investigation materials (e.g., acetate liners) will be drummed or bagged and disposed of in accordance with Federal, State, and local regulations.

10.2 POTENTIAL SPILL AREAS

Potential spill areas will be monitored in an ongoing attempt to prevent and control further potential contamination of the environment. Currently, there are few areas vulnerable to this hazard including the area used for central staging and decontamination.

10.3 LEAK AND SPILL DETECTION

To establish an early detection of potential spills or leaks, a periodic walk-around by personnel staging or disposing of containers will be conducted at least once each week while site activities are underway. These inspections are to be performed during working hours, to visually determine that containers are not leaking. Any leaks identified will be collected and contained using absorbents such as Oil-dry, vermiculite, or sand, stored at the staging area in a drum conspicuously marked. This material too, will be containerized for disposal pending analyses. All inspections are to be documented in the Project Logbook.

10.4 PERSONNEL TRAINING AND SPILL PREVENTION

All personnel will be instructed on the procedures for spill prevention, containment, and collection of hazardous materials in the site-specific training. The FOL or SSO will serve as the Spill Response Coordinator for this operation should the need arise.

10.5 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents examples of the equipment that may be maintained at the staging area for the purpose of supporting this Spill Prevention/Containment Program.

- 55-gallon U.S. DOT 17-E or 17-H drums
- Shovels, rakes, and brooms
- Labels

10.6 SPILL CONTROL PLAN

It is not anticipated that a spill will occur which the field crews cannot handle. Should one occur, however, the FOL or SSO will carry out notification of appropriate emergency response agencies. The following describes the steps field personnel will implement upon detecting a spill or leak.

1. Notify the SSO or FOL immediately upon the detection of a leak or spill.
2. Use the personal protective equipment stored at the staging area. Take immediate actions to stop the leak or spill by plugging or patching the drum/container or raising the leak to the highest point. Spread the absorbent material in the area of the spill covering completely.
3. Transfer the material to a new drum/container, collect and containerize the absorbent material. Label the new drum/container appropriately. Await analyses for shipment or disposal options.

11.0 CONFINED-SPACE ENTRY

It is not anticipated, under the proposed scope of work, that confined space and permit-required confined space activities will be conducted. **Therefore, personnel under the provisions of this HASP are not allowed, under any circumstances, to enter any confined spaces.** A confined space is defined as an area which has one or more of the following characteristics:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry).
- Is not designed for continuous employee occupancy.

A Permit-Required Confined Space is one that:

- Contains or has a potential to contain a hazardous atmosphere.
- Contains a material that has the potential to engulf an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section.
- Contains any other recognized, serious, safety or health hazard.

For further information on confined space, consult the Health and Safety Guidance Manual or call the PHSO. If confined space operations are to be performed as part of the scope of work, detailed procedures and training requirements will have to be addressed.

12.0 MATERIALS AND DOCUMENTATION

The TtNUS FOL shall ensure the following materials/documents are taken to the project site and used when required.

- A complete copy of this HASP
- Health and Safety Guidance Manual
- Incident Reports
- Medical Data Sheets
- Material Safety Data Sheets for all chemicals brought on site, including decon solution, fuels, sample preservations, calibration gases, etc.
- A full size OSHA Job Safety and Health Poster
- Training/Medical Surveillance Documentation Form (blank)
- Emergency Reference Form (Section 2.0, extra copy for posting)
- A copy of the confined space entry program with extra copies of permits

12.1 MATERIALS TO BE POSTED OR MAINTAINED AT THE SITE

The following documentation is to be posted or maintained at the site for quick reference purposes. In situations where posting specified documents is not feasible, (such as no office trailer), these documents should be separated and immediately accessible.

Chemical Inventory Listing (maintained) - This list represents all chemicals brought on site, including decontamination solutions, sample preservations, fuel, etc.. This list should be posted in a central area.

Material Safety Data Sheets (MSDS) (maintained) - The MSDSs should also be in a central area accessible to all site personnel. These documents should match all the listings on the chemical inventory list for all substances employed on site. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

The OSHA Job Safety & Health Protection Poster (posted) - this poster, as directed by 29 CFR 1903.2 (a)(1), should be conspicuously posted in places where notices to employees are normally posted. Each FOL shall ensure that this poster is not defaced, altered, or covered by other material. A copy of the OSHA poster is included in Attachment IV of this HASP.

Site Clearance Posting (maintained) - This list is found within the training section of the HASP (See Figure 8-2). This list identifies all site personnel, dates of training (including site-specific training), and medical surveillance. The list indicates not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities.

Emergency Phone Numbers and Directions to the Hospital(s) (posted) - This list of numbers and directions will be maintained at all phone communications points and in each site vehicle.

Medical Data Sheets/Cards (maintained) - Medical Data Sheets will be filled out by on site personnel and filed in a central location. The Medical Data Sheet will accompany any injury or illness requiring medical attention to the medical facility. A copy of this sheet or a wallet card will be given to all personnel to be carried on their person.

Hearing Conservation Standard (29 CFR 1910.95) (posted) - this standard will be posted anytime hearing protection or other noise abatement procedures are employed.

13.0 GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienists
APR	Air Purifying Respirators
AST	Aboveground Storage Tank
CAS	Chemical Abstract Service
CFR	Code of Federal Regulations
CNS	Central Nervous System
CRZ	Contamination Reduction Zone
DOD	Department of Defense
DOT	Department of Transportation
EPA	Environmental Protection Agency
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air
I.P.	Ionization Potential
N/A	Not Available
NIOSH	National Institute Occupational Safety and Health
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PAH	Polycyclic Aromatic Hydrocarbons
PEL	Permissible Exposure Limit
PHSO	Project Health and Safety Officer
PPE	Personal Protective Equipment
PVC	Poly Vinyl Chloride
SAP	Sampling and Analysis Plan
SCBA	Self Contained Breathing Apparatus
SSO	Site Safety Officer
STEL	Short Term Exposure Limit
SWMU	Solid Waste Management Unit
TOM	Task Order Manager
TPH	Total Petroleum Hydrocarbons
TWA	Time Weighted Average
WP	Work Plan

ATTACHMENT I

**INJURY/ILLNESS PROCEDURE
AND REPORT FORM**

TETRA TECH NUS, INC.

INJURY/ILLNESS PROCEDURE WORKER'S COMPENSATION PROGRAM

WHAT YOU SHOULD DO IF YOU ARE INJURED OR DEVELOP AN ILLNESS AS A RESULT OF YOUR EMPLOYMENT:

- Stop work as needed to ensure no further harm is done.
- If injury is minor, obtain appropriate first aid treatment.
- If injury or illness is severe or life threatening, obtain professional medical treatment at the nearest hospital emergency room. Check with your office location or project health and safety plan for specific instructions.
- If incident involves an injury, illness, or chemical exposure on a project work site, follow instructions in the Health & Safety Plan.
- Immediately report any injury or illness to your supervisor or office manager. In addition, you must contact your Human Resources representative, Marilyn Duffy at (412) 921-8475, and the Corporate Health and Safety Manager, Matt Soltis at (412) 921-8912 within 24 hours of the injury. You will be required to complete an [Injury/Illness Report](#). You may also be required to participate in a more detailed investigation with the Health Sciences Department.
- In the event of a serious near-miss incident, a "Serious Near Miss Report" (Form AR-2, available online at <https://go2.tetrattech.com> under "Departments", "Health and Safety", "Accident Reporting Procedures", hyperlink for "Serious Near Miss Report") must be completed and faxed to the Corporate Health and Safety Manager within 48 hours.
- If further medical treatment is needed, our insurance carrier, ACE, will provide information on the authorized providers customized to the location of the injured employee. You can find this information by accessing the website of ACE's claims handler, ESIS, at : www.esis.com. These providers are to be used for treatment of Worker's Compensation injuries subject to the laws of the state in which you work.

ADDITIONAL QUESTIONS REGARDING WORKER'S COMPENSATION:

Contact your local Human Resources representative (Marilyn Duffy), Corporate Health and Safety Manager (Matt Soltis), or Corporate Administration in Pasadena, California, at (626) 351-4664.

Worker's compensation is a state-mandated program that provides medical and disability benefits to employees who become disabled due to job related injury or illness. Tetra Tech, Inc. and its subsidiaries pay premiums on behalf of their employees. This program is based on a no-fault system, and benefits are provided for covered events as an exclusive remedy to the injured employee regardless of fault. The types of injuries or illnesses covered and the amount of

benefits paid are regulated by the state worker's compensation boards and vary from state to state. Corporate Administration in Pasadena is responsible for administering the Company's worker's compensation program. The following is a general explanation of worker's compensation provided in the event that you become injured or develop an illness as a result of your employment with Tetra Tech or any of its subsidiaries. Please be aware that the term used for worker's compensation varies from state to state.

WHO IS COVERED:

All employees of Tetra Tech, whether they are on a full-time, part-time or temporary status, working in an office or in the field, are entitled to worker's compensation benefits from the first day of work. All employees must follow the above injury/illness reporting procedures. If you are working out-of-state and away from your home office, you are still eligible for worker's compensation benefits.

Consultants, independent contractors, and employees of subcontractors and employees from temporary employment agencies are not covered by Tetra Tech's Worker's Compensation plan.

WHAT IS COVERED:

If you are injured or develop an illness caused by your employment, worker's compensation benefits are available to you subject to the laws of the state you work in. Injuries do not have to be serious; even injuries treated by first aid practices are covered and must be reported.



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT

To: _____
Subsidiary Health and Safety Representative

Prepared by: _____

Position: _____

cc: _____
Workers Compensation Administrator

Office: _____

Project name: _____

Telephone number: _____

Project number: _____

Fax number: _____

Information Regarding Injured or Ill Employee

Name: _____

Office: _____

Home address: _____

Gender: M ☐ F ☐ No. of dependents: _____

Marital status: _____

Home telephone number: _____

Date of birth: _____

Occupation (regular job title): _____

Social security number: _____

Department: _____

Date of Accident: _____

Time of Accident: _____ a.m. ☐ p.m. ☐

Time Employee Began Work: _____

☐ Check if time cannot be determined

Location of Incident

Street address: _____

City, state, and zip code: _____

County: _____

Was place of accident or exposure on employer's premises? Yes ☐ No ☐

Information About the Incident

What was the employee doing just before the incident occurred? Describe the activity as well as the tools, equipment, or material the employee was using. Be specific. Examples: "Climbing a ladder while carrying roofing materials"; "Spraying chlorine from hand sprayer"; "Daily computer key-entry"

What Happened? Describe how the injury occurred. Examples: "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time"

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Information About the Incident (Continued)

What was the injury or illness? Describe the part(s) of the body affected and how it was affected. Be more specific than "hurt," "pain," or "sore." Examples "Strained back"; "Chemical burn, right hand"; "Carpal tunnel syndrome, left wrist"

Describe the Object or Substance that Directly Harmed the Employee: Examples: "Concrete floor"; "Chlorine"; "Radial arm saw." If this question does not apply to the incident, write "Not applicable."

Did the employee die? Yes ☐ No ☐ Date of death: _____

Was employee performing regular job duties? Yes ☐ No ☐

Was safety equipment provided? Yes ☐ No ☐ Was safety equipment used? Yes ☐ No ☐

Note: Attach any police reports or related diagrams to this report.

Witness (Attach additional sheets for other witnesses.)

Name: _____

Company: _____

Street address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

Medical Treatment Required? ☐ Yes ☐ No ☐ First aid only

Name of physician or health care professional: _____

If treatment was provided away from the work site, provide the information below.

Facility name: _____

Street address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

Was the employee treated in an emergency room? ☐ Yes ☐ No

Was the employee hospitalized over night as an in-patient? ☐ Yes ☐ No

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Corrective Action(s) Taken by Unit Reporting the Accident:

Corrective Action Still to be Taken (by whom and when):

Name of Tetra Tech employee the injury or illness was first reported to: _____

Date of Report: _____ **Time of Report:** _____

I have reviewed this investigation report and agree, to the best of my recollection, with its contents.

Printed Name of Injured Employee

Telephone Number

Signature of Injured Employee

Date

The signatures provided below indicate that appropriate personnel have been notified of the incident.

Title	Printed Name	Signature	Telephone Number	Date
Office Manager				
Project Manager				
Site Safety Coordinator or Office Health and Safety Representative				

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.



TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

To Be Completed by the Subsidiary Health and Safety Representative

Classification of Incident:

☐ Injury ☐ Illness

Result of Incident:

- ☐ First aid only
☐ Days away from work
☐ Remained at work but incident resulted in job transfer or work restriction
☐ Incident involved days away and job transfer or work restriction
☐ Medical treatment only

No. of days away from work _____

Date employee left work _____

Date employee returned to work _____

No. of days placed on restriction or job transfer: _____

OSHA Recordable Case Number _____

To Be Completed by Human Resources

Social security number: _____

Date of hire: _____ Hire date for current job: _____

Wage information: \$ _____ per ☐ Hour ☐ Day ☐ Week ☐ Month

Position at time of hire: _____

Current position: _____ Shift hours: _____

State in which employee was hired: _____

Status: ☐ Full-time ☐ Part-time Hours per week: _____ Days per week: _____

Temporary job end date: _____

To Be Completed during Report to Workers Compensation Carrier

Date reported: _____ Reported by: _____

Confirmation number: _____

Name of contact: _____

Field office of claims adjuster: _____

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

ATTACHMENT II

MEDICAL DATA SHEET

MEDICAL DATA SHEET

This Medical Data Sheet must be completed by all on-site personnel and kept in the command post during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project _____

Name _____ Home Telephone _____

Address _____

Age _____ Height _____ Weight _____

Name of Next Kin _____

Drug or other Allergies _____

Particular Sensitivities _____

Do You Wear Contacts? _____

Provide a Checklist of Previous Illnesses or Exposure to Hazardous Chemicals _____

What medications are you presently using? _____

Do you have any medical restrictions? _____

Name, Address, and Phone Number of personal physician: _____

I am the individual described above. I have read and understand this HASP.

Signature

Date

ATTACHMENT III

SAFE WORK PERMITS

**SAFE WORK PERMIT
DECONTAMINATION ACTIVITIES
TRUMAN ANNEX WATER TOWER SITE NAS KEY WEST, FLORIDA**

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Decontamination of sampling equipment and machinery (i.e., DPT rigs and associated equipment). Brushes and spray bottles will be used to decontaminate small sampling equipment.
- II. Required Monitoring Instrument(s): None required – visual observation
- III. Field Crew: _____
- IV. On-site Inspection conducted ☒ Yes ☐ No Initials of Inspector _____
TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

- IV. Protective equipment required Respiratory equipment required
- | | | | |
|---|----------------------------------|--|--|
| Level D <input checked="" type="checkbox"/> | Level B <input type="checkbox"/> | Full face APR <input type="checkbox"/> | Escape Pack <input type="checkbox"/> |
| Level C <input type="checkbox"/> | Level A <input type="checkbox"/> | Half face APR <input type="checkbox"/> | SCBA <input type="checkbox"/> |
| Detailed on Reverse | | SKA-PAC SAR <input type="checkbox"/> | Bottle Trailer <input type="checkbox"/> |
| | | Skid Rig <input type="checkbox"/> | None <input checked="" type="checkbox"/> |

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety glasses, safety footwear, and nitrile gloves. When using pressure washers, steam cleaners field crews will wear hearing protection, and face shields (over safety impact glasses).

- | V. Chemicals of Concern | Action Level(s) | Response Measures |
|-------------------------|---------------------------|-------------------------------|
| <u>Lead</u> | <u>Visual observation</u> | <u>Repeat decontamination</u> |

VI. Additional Safety Equipment/Procedures

- | | | | |
|------------------------------------|---|--|---|
| Hard-hat..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash Shield..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Barricades..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Gloves (Type - <u>Nitrile</u>) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work shoes or boots..... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

Modifications/Exceptions: PVC rain suits or PE or PVC coated Tyvek for protection against splashes and overspray. Chemical resistant boot covers if excessive liquids are generated or to protect footwear. Hard hat at SSO discretion or if required for face shield. Face shield over safety glasses and hearing protection when operating pressure washer.

- | | | | | |
|--|--------------------------|--------------------------|-------------------------|--------------------------|
| VII. Procedure review with permit acceptors | Yes | NA | Yes | NA |
| Safety shower/eyewash (Location & Use)..... | <input type="checkbox"/> | <input type="checkbox"/> | Emergency alarms | <input type="checkbox"/> |
| Procedure for safe job completion | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes | <input type="checkbox"/> |
| Contractor tools/equipment/PPE inspected | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points | <input type="checkbox"/> |

- | | | | |
|---|--------------------------|--------------------------|--------------------------|
| VIII. Site Preparation | Yes | No | NA |
| Utility Locating and Excavation Clearance completed..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vehicle and Foot Traffic Routes Cleared and Established | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Physical Hazards Barricaded and Isolated..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Equipment Staged | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- IX. Additional Permits required (Hot work, confined space entry, excavation etc.): ☐ Yes ☒ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

- X. Special instructions, precautions: Chemical hazards with decontamination because of use of fluids such as alconox, isopropyl alcohol, methanol, etc. To minimize the potential for exposure, site personnel will use PPE and prevent contact with potentially contaminated equipment. Refer to the manufacturer's MSDS regarding PPE, handling, storage, and first-aid measures related to any decontamination solvents used.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
MOBILIZATION AND DEMOBILIZATION ACTIVITIES
TRUMAN ANNEX WATER TOWER SITE NAS KEY WEST, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Mobilization and demobilization activities. This Permit may also be used for geophysical surveying activities in non-contaminated areas since similar hazards are present.
- II. Required Monitoring Instruments: None
- III. Field Crew: _____
- IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

- IV. Protective equipment required Respiratory equipment required
- | | | | |
|---|----------------------------------|--|--|
| Level D <input checked="" type="checkbox"/> | Level B <input type="checkbox"/> | Full face APR <input type="checkbox"/> | Escape Pack <input type="checkbox"/> |
| Level C <input type="checkbox"/> | Level A <input type="checkbox"/> | Half face APR <input type="checkbox"/> | SCBA <input type="checkbox"/> |
| Detailed on Reverse | | SKA-PAC SAR <input type="checkbox"/> | Bottle Trailer <input type="checkbox"/> |
| | | Skid Rig <input type="checkbox"/> | None <input checked="" type="checkbox"/> |
- Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants and safety footwear. Safety glasses at the SSO's discretion. Hard hats and hearing protection will be worn when working near operating equipment.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>None anticipated</u>	<u>NA</u>	<u>NA</u>

- VI. Additional Safety Equipment/Procedures
- | | | | |
|-------------------------------------|---|--|---|
| Hard-hat | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Safety Glasses | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash Shield | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Gloves (Type - <u>Nitrile</u>) | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Steel toe Work shoes or boots | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
- Modifications/Exceptions: Tyvek coverall to protect against natural hazards (e.g., ticks). If working in areas where snakes are a threat, wear snake chaps to protect against bites. Reflective vests if working in areas where vehicle traffic or operating equipment exists.

- | | | | | |
|--|--------------------------|--------------------------|-------------------------|--------------------------|
| VII. Procedure review with permit acceptors | Yes | NA | Yes | NA |
| Safety shower/eyewash (Location & Use) | <input type="checkbox"/> | <input type="checkbox"/> | Emergency alarms | <input type="checkbox"/> |
| Procedure for safe job completion | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes | <input type="checkbox"/> |
| Contractor tools/equipment/PPE inspected | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points | <input type="checkbox"/> |

- VIII. Site Preparation
- | | | | |
|---|--------------------------|--------------------------|--------------------------|
| | Yes | No | NA |
| Utility Locating and Excavation Clearance completed | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vehicle and Foot Traffic Routes Cleared and Established | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Physical Hazards Barricaded and Isolated | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Equipment Staged | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- IX. Additional Permits required (Hot work, confined space entry, excavation etc.)
- ☐ Yes ☒ No
- If yes, complete permit required or contact Health Sciences, Pittsburgh Office*

- X. Special instructions, precautions: Preview work locations to identify potential hazards (slips, trips, and falls, natural hazards, etc.) Avoid potential nesting areas. Wear light colored clothing so that ticks and other biting insects can be easily visible and can be removed. Inspect clothing and body for ticks. Minimize contact with potentially contaminated media. Suspend site activities in the event of inclement weather. Use safe lifting practices.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
CONFIRMATION SOIL SAMPLING / SURVEYING
TRUMAN ANNEX WATER TOWER SITE NAS KEY WEST, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Confirmation soil sampling / surveying (GPS) and geophysical surveys in potential contaminated areas.
- II. Required Monitoring Instrument(s): XRF to detect lead concentrations
- III. Field Crew: _____
- IV. On-site Inspection conducted ☒ Yes ☐ No Initials of Inspector TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

- V. Protective equipment required Respiratory equipment required
- | | | |
|--|--|--|
| Level D <input checked="" type="checkbox"/> Level B <input type="checkbox"/> | Full face APR <input type="checkbox"/> | Escape Pack <input type="checkbox"/> |
| Level C <input type="checkbox"/> Level A <input type="checkbox"/> | Half face APR <input type="checkbox"/> | SCBA <input type="checkbox"/> |
| Detailed on Reverse | SKA-PAC SAR <input type="checkbox"/> | Bottle Trailer <input type="checkbox"/> |
| | Skid Rig <input type="checkbox"/> | None <input checked="" type="checkbox"/> |

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, safety glasses, surgeon's gloves and high visibility reflective vests. Hard hats and hearing protection will be worn when working near operating equipment and or when required by the facility. Tyvek, outer boots at SSO's discretion.

V. Chemicals of Concern	Action Level(s)	Response Measures
<u>Lead</u>	<u>Visual observations of dust</u>	<u>Area wetting / Retreat to an unaffected area - Contact the PHSO for guidance.</u>
_____	_____	_____
_____	_____	_____

VII. Additional Safety Equipment/Procedures

- | | | | |
|------------------------------------|---|--------------------------------------|---|
| Hard-hat..... | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) ... | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness..... | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash Shield | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls | <input type="checkbox"/> Yes <input type="checkbox"/> No | Gloves (Type - Nitrile) | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work shoes or boots..... | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

Modifications/Exceptions: Tyvek coverall and boot covers if there is a potential for exposure to dust and or soiling work cloths.. Double-layer gloves at SSO's discretion.

VIII. Procedure review with permit acceptors	Yes	NA	Yes	NA
Safety shower/eyewash (Location & Use).....	<input type="checkbox"/>	<input type="checkbox"/>	Emergency alarms	<input type="checkbox"/>
Procedure for safe job completion	<input type="checkbox"/>	<input type="checkbox"/>	Evacuation routes	<input type="checkbox"/>
Contractor tools/equipment/PPE inspected	<input type="checkbox"/>	<input type="checkbox"/>	Assembly points	<input type="checkbox"/>

IX. Site Preparation	Yes	No	NA
Utility Locating and Excavation Clearance completed.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle and Foot Traffic Routes Cleared and Established	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical Hazards Barricaded and Isolated.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Emergency Equipment Staged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- X. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

- XI. Special instructions, precautions: These sampling efforts will be conducted during excavation operations to confirm lead contaminated soil is not present. TtNUS personnel will remain in an unaffected area (away from airborne dusts and excavation operations). When collecting samples, ensure two-way visual contact with equipment operator is achieved. Although not anticipated, do not enter open excavations that pose a cave-in hazard (>3 feet deep). Minimize contact with potentially contaminated soils. If airborne dusts are observed, contact the PHSO for additional guidance. Prevent potential exposures via incidental ingestion and skin contact through the use of safe work practices, PPE and appropriate decontamination and personal hygiene practices. Avoid soiling work attire – if necessary use tyvek coveralls.

SAFE WORK PERMIT
DELINEATION SOIL SAMPLING USING DPT
TRUMAN ANNEX WATER TOWER SITE NAS KEY WEST, FLORIDA

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

- I. Work limited to the following (description, area, equipment used): Delineation soil sampling using DPT,
 II. Required Monitoring Instruments: XRF to detected lead concentrations
 III. Field Crew: _____
 IV. On-site Inspection conducted ☒ Yes ☐ No Initials of Inspector TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

- V. Protective equipment required Respiratory equipment required
 Level D ☒ Level B ☐ Full face APR ☐ Escape Pack ☐
 Level C ☐ Level A ☐ Half face APR ☐ SCBA ☐
 Detailed on Reverse SAR ☐ Bottle Trailer ☐
 Skid Rig ☐ None ☐

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety footwear, and nitrile gloves. Safety glasses, hard hats, and hearing protection will be worn when working near or sampling in the vicinity of operating equipment.

- | | | |
|-------------------------|------------------------------------|--|
| V. Chemicals of Concern | Action Level(s) | Response Measures |
| <u>Lead</u> | <u>Visual observations of dust</u> | <u>Area wetting / Retreat to an unaffected area - Contact the PHSO for guidance.</u> |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

VII. Additional Safety Equipment/Procedures

- | | |
|--|--|
| Hard-hat..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Hearing Protection (Plugs/Muffs) ... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Safety Glasses..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Safety belt/harness..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Chemical/splash goggles..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Radio..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash Shield..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Barricades..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Splash suits/coveralls..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Gloves (Type - Nitrile)..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Steel toe Work shoes or boots..... <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | Work/rest regimen..... <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |

Modifications/Exceptions: Reflective vests for high traffic area or when working near equipment. Tyvek overall if there is a potential for soiling work cloths.

- | | | | |
|---|--------------------------|--------------------------|---|
| VII. Procedure review with permit acceptors | Yes | NA | Emergency alarms..... <input type="checkbox"/> Yes <input type="checkbox"/> NA |
| Safety shower/eyewash (Location & Use)..... | <input type="checkbox"/> | <input type="checkbox"/> | Evacuation routes..... <input type="checkbox"/> Yes <input type="checkbox"/> NA |
| Procedure for safe job completion..... | <input type="checkbox"/> | <input type="checkbox"/> | Assembly points..... <input type="checkbox"/> Yes <input type="checkbox"/> NA |
| Contractor tools/equipment/PPE inspected..... | <input type="checkbox"/> | <input type="checkbox"/> | |

- | | | | |
|--|--------------------------|--------------------------|--------------------------|
| VIII. Site Preparation | Yes | No | NA |
| Utility Locating and Excavation Clearance completed..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Vehicle and Foot Traffic Routes Cleared and Established..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Physical Hazards Barricaded and Isolated..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emergency Equipment Staged..... | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- X. Additional Permits required (Hot work, confined space entry, excavation etc.).....☐ Yes ☐ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

- XI. Special instructions, precautions: Inspect site equipment using Attachment III. Ensure equipment is operated by experienced personnel. Maintain visual contact with equipment operators. Avoid contact with moving parts, rotating or advancing tools. Minimize contact with potentially contaminated soils. If airborne dusts are observed, contact the PHSO for additional guidance. Prevent potential exposures via incidental ingestion and skin contact through the use of safe work practices, PPE and appropriate decontamination and personal hygiene practices. Avoid soiling work attire – if necessary use tyvek coveralls.

Permit Issued by: _____ Permit Accepted by: _____

ATTACHMENT IV

OSHA POSTER

You Have a Right to a Safe and Healthful Workplace. IT'S THE LAW!

- You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.
- You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in the inspection.
- You can file a complaint with OSHA within 30 days of discrimination by your employer for making safety and health complaints or for exercising your rights under the *OSH Act*.
- You have a right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violation.
- Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.
- You have the right to copies of your medical records or records of your exposure to toxic and harmful substances or conditions.
- Your employer must post this notice in your workplace.

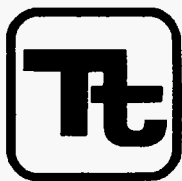


The *Occupational Safety and Health Act of 1970 (OSH Act)*, P.L. 91-596, assures safe and healthful working conditions for working men and women throughout the Nation. The Occupational Safety and Health Administration, in the U.S. Department of Labor, has the primary responsibility for administering the *OSH Act*. The rights listed here may vary depending on the particular circumstances. To file a complaint, report an emergency, or seek OSHA advice, assistance, or products, call 1-800-321-OSHA or your nearest OSHA office: • Atlanta (404) 562-2300 • Boston (617) 565-9860 • Chicago (312) 353-2220 • Dallas (214) 767-4731 • Denver (303) 844-1600 • Kansas City (816) 426-5861 • New York (212) 337-2378 • Philadelphia (215) 861-4900 • San Francisco (415) 975-4310 • Seattle (206) 553-5930. Teletypewriter (TTY) number is 1-877-889-5627. To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website at www.osha.gov. If your workplace is in a state operating under an OSHA-approved plan, your employer must post the required state equivalent of this poster.

1-800-321-OSHA www.osha.gov

ATTACHMENT V

**STANDARD OPERATING PROCEDURE
FOR
UTILITY LOCATING AND EXCAVATION
CLEARANCE**



TETRA TECH NUS, INC.

STANDARD OPERATING PROCEDURES

Number	HS-1.0	Page	1 of 15
Effective Date	12/03	Revision	2
Applicability	Tetra Tech NUS, Inc.		
Prepared	Health & Safety		
Approved	D. Senovich <i>[Signature]</i>		

Subject
UTILITY LOCATING AND EXCAVATION CLEARANCE

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Subject UTILITY LOCATING AND EXCAVATION CLEARANCE	Number HS-1.0	Page 2 of 15
	Revision 2	Effective Date 12/03

1.0 PURPOSE

Utilities such as electric service lines, natural or propane gas lines, water and sewage lines, telecommunications, and steam lines are very often in the immediate vicinity of work locations. Contact with underground or overhead utilities can have serious consequences including employee injury/fatality, property and equipment damage, substantial financial impacts, and loss of utility service to users.

The purpose of this procedure is to provide minimum requirements and technical guidelines regarding the appropriate procedures to be followed when performing subsurface and overhead utility locating services. It is the policy of Tetra Tech NUS, Inc. (TtNUS) to provide a safe and healthful work environment for the protection of our employees. The purpose of this Standard Operating Procedure (SOP) is to aid in achieving the objectives of this policy, to present the acceptable procedures pertaining to utility locating and excavation clearance activities, and to present requirements and restrictions relevant to these types of activities. This SOP must be reviewed by any employee potentially involved with underground or overhead utility locating and avoidance activities.

2.0 SCOPE

This procedure applies to all TtNUS field activities where there may be potential contact with underground or overhead utilities. This procedure provides a description of the principles of operation, instrumentation, applicability, and implementability of typical methods used to determine the presence and avoidance of contact with utility services. This procedure is intended to assist with work planning and scheduling, resource planning, field implementation, and subcontractor procurement. Utility locating and excavation clearance requires site-specific information prior to the initiation of any such activities on a specific project. This SOP is not intended to provide a detailed description of methodology and instrument operation. Specialized expertise during both planning and execution of several of the methods presented may also be required.

3.0 GLOSSARY

Electromagnetic Induction (EMI) Survey - A geophysical exploration method whereby electromagnetic fields are induced in the ground and the resultant secondary electromagnetic fields are detected as a measure of ground conductivity.

Magnetometer – A device used for precise and sensitive measurements of magnetic fields.

Magnetic Survey – A geophysical survey method that depends on detection of magnetic anomalies caused by the presence of buried ferromagnetic objects.

Metal Detection – A geophysical survey method that is based on electromagnetic coupling caused by underground conductive objects.

Vertical Gradiometer – A magnetometer equipped with two sensors that are vertically separated by a fixed distance. It is best suited to map near surface features and is less susceptible to deep geologic features.

Ground Penetrating Radar – Ground Penetrating Radar (GPR) involves specialized radar equipment whereby a signal is sent into the ground via a transmitter. Some portion of the signal will be reflected from the subsurface material, which is then recorded with a receiver and electronically converted into a graphic picture.

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4.0 RESPONSIBILITIES

Project Manager (PM)/Task Order Manager (TOM) - Responsible for ensuring that all field activities are conducted in accordance with this procedure.

Site Manager (SM)/Field Operations Leader (FOL) - Responsible for the onsite verification that all field activities are performed in compliance with approved SOPs or as otherwise directed by the approved project plan(s).

Site Health & Safety Officer (SHSO) – Responsible to provide technical assistance and verify full compliance with this SOP. The SHSO is also responsible for reporting any deficiencies to the Corporate Health and Safety Manager (HSM) and to the PM/TOM.

Health & Safety Manager (HSM) – Responsible for preparing, implementing, and modifying corporate health and safety policy and this SOP.

Site Personnel – Responsible for performing their work activities in accordance with this SOP and the TtNUS Health and Safety Policy.

5.0 PROCEDURES

This procedure addresses the requirements and technical procedures that must be performed to minimize the potential for contact with underground and overhead utility services. These procedures are addressed individually from a buried and overhead standpoint.

5.1 Buried Utilities

Buried utilities present a heightened concern because their location is not typically obvious by visual observation, and it is common that their presence and/or location is unknown or incorrectly known on client properties. This procedure must be followed prior to beginning any subsurface probing or excavation that might potentially be in the vicinity of underground utility services. In addition, the Utility Clearance Form (Attachment 3) must be completed for every location or cluster of locations where intrusive activities will occur.

Where the positive identification and de-energizing of underground utilities cannot be obtained and confirmed using the following steps, the PM/TOM is responsible for arranging for the procurement of a qualified, experienced, utility locating subcontractor who will accomplish the utility location and demarcation duties specified herein.

1. A comprehensive review must be made of any available property maps, blue lines, or as-builts prior to site activities. Interviews with local personnel familiar with the area should be performed to provide additional information concerning the location of potential underground utilities. Information regarding utility locations shall be added to project maps upon completion of this exercise.
- 2., A visual site inspection must be performed to compare the site plan information to actual field conditions. Any findings must be documented and the site plan/maps revised. The area(s) of proposed excavation or other subsurface activities must be marked at the site in white paint or pin flags to identify those locations of the proposed intrusive activities. The site inspection should focus on locating surface indications of potential underground utilities. Items of interest include the presence of nearby area lights, telephone service, drainage grates, fire hydrants, electrical service vaults/panels, asphalt/concrete scars and patches, and topographical depressions. Note the location of any emergency shut off switches. Any additional information regarding utility

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locations shall be added to project maps upon completion of this exercise and returned to the PM/TOM.

3. If the planned work is to be conducted on private property (e.g., military installations, manufacturing facilities, etc.) the FOL must identify and contact appropriate facility personnel (e.g., public works or facility engineering) before any intrusive work begins to inquire about (and comply with) property owner requirements. It is important to note that private property owners may require several days to several weeks advance notice prior to locating utilities.
4. If the work location is on public property, the state agency that performs utility clearances must be notified (see Attachment 1). State "one-call" services must be notified prior to commencing fieldwork per their requirements. Most one-call services require, by law, 48- to 72-hour advance notice prior to beginning any excavation. Such services typically assign a "ticket" number to the particular site. This ticket number must be recorded for future reference and is valid for a specific period of time, but may be extended by contacting the service again. The utility service will notify utility representatives who then mark their respective lines within the specified time frame. It should be noted that most military installations own their own utilities but may lease service and maintenance from area providers. Given this situation, "one call" systems may still be required to provide location services on military installations.
5. Utilities must be identified and their locations plainly marked using pin flags, spray paint, or other accepted means. The location of all utilities must be noted on a field sketch for future inclusion on project maps. Utility locations are to be identified using the following industry-standard color code scheme, unless the property owner or utility locator service uses a different color code:

white	excavation/subsurface investigation location
red	electrical
yellow	gas, oil, steam
orange	telephone, communications
blue	water, irrigation, slurry
green	sewer, drain
6. Where utility locations are not confirmed with a high degree of confidence through drawings, schematics, location services, etc., the work area must be thoroughly investigated prior to beginning the excavation. In these situations, utilities must be identified using safe and effective methods such as passive and intrusive surveys, or the use of non-conductive hand tools. Also, in situations where such hand tools are used, they should always be used in conjunction with suitable detection equipment, such as the items described in Section 6.0 of this SOP. Each method has advantages and disadvantages including complexity, applicability, and price. It also should be noted that in some states, initial excavation is required by hand to a specified depth.
7. At each location where trenching or excavating will occur using a backhoe or other heavy equipment, and where utility identifications and locations cannot be confirmed prior to groundbreaking, the soil must be probed using a device such as a tile probe which is made of non-conductive material such as fiberglass. If these efforts are not successful in clearing the excavation area of suspect utilities, hand shoveling must be performed for the perimeter of the intended excavation.
8. All utilities uncovered or undermined during excavation must be structurally supported to prevent potential damage. Unless necessary as an emergency corrective measure, TtNUS shall not make any repairs or modifications to existing utility lines without prior permission of the utility owner, property owner, and Corporate HSM. All repairs require that the line be locked-out/tagged-out prior to work.

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5.2 Overhead Power Lines

If it is necessary to work within the minimum clearance distance of an overhead power line, the overhead line must be de-energized and grounded, or re-routed by the utility company or a registered electrician. If protective measures such as guarding, isolating, or insulating are provided, these precautions must be adequate to prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

The following table provides the required minimum clearances for working in proximity to overhead power lines.

<u>Nominal Voltage</u>	<u>Minimum Clearance</u>
0 -50 kV	10 feet, or one mast length; whichever is greater
50+ kV	10 feet plus 4 inches for every 10 kV over 50 kV or 1.5 mast lengths; whichever is greater

6.0 UNDERGROUND LOCATING TECHNIQUES

A variety of supplemental utility locating approaches are available and can be applied when additional assurance is needed. The selection of the appropriate method(s) to employ is site-specific and should be tailored to the anticipated conditions, site and project constraints, and personnel capabilities.

6.1 Geophysical Methods

Geophysical methods include electromagnetic induction, magnetics, and ground penetrating radar. Additional details concerning the design and implementation of electromagnetic induction, magnetics, and ground penetrating radar surveys can be found in one or more of the TtNUS SOPs included in the References (Section 8.0).

Electromagnetic Induction

Electromagnetic Induction (EMI) line locators operate either by locating a background signal or by locating a signal introduced into the utility line using a transmitter. A utility line acts like a radio antenna, producing electrons, which can be picked up with a radiofrequency receiver. Electrical current carrying conductors have a 60HZ signal associated with them. This signal occurs in all power lines regardless of voltage. Utilities in close proximity to power lines or used as grounds may also have a 60HZ signal, which can be picked up with an EM receiver. A typical example of this type of geophysical equipment is an EM-61.

EMI locators specifically designed for utility locating use a special signal that is either indirectly induced onto a utility line by placing the transmitter above the line or directly induced using an induction clamp. The clamp induces a signal on the specific utility and is the preferred method of tracing since there is little chance of the resulting signals being interfered with. A good example of this type of equipment is the Schonstedt® MAC-51B locator. The MAC-51B performs inductively traced surveys, simple magnetic locating, and traced nonmetallic surveys.

When access can be gained inside a conduit to be traced, a flexible insulated trace wire can be used. This is very useful for non-metallic conduits but is limited by the availability of gaining access inside the pipe.

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Magnetics

Magnetic locators operate by detecting the relative amounts of buried ferrous metal. They are incapable of locating or identifying nonferrous utility lines but can be very useful for locating underground storage tanks (UST's), steel utility lines, and buried electrical lines. A typical example of this type of equipment is the Schonstedt® GA-52Cx locator. The GA-52Cx is capable of locating 4-inch steel pipe up to 8 feet deep.

Non-ferrous lines are often located by using a typical plumbing tool (snake) fed through the line. A signal is then introduced to the snake that is then traced.

Ground Penetrating Radar

Ground Penetrating Radar (GPR) involves specialized radar equipment whereby a signal is sent into the ground via a transmitter. Some portion of the signal will be reflected from the subsurface material, which is then recorded with a receiver and electronically converted into a graphic picture. In general, an object which is harder than the surrounding soil will reflect a stronger signal. Utilities, tunnels, UST's, and footings will reflect a stronger signal than the surrounding soil. Although this surface detection method may determine the location of a utility, this method does not specifically identify utilities (i.e., water vs. gas, electrical vs. telephone); hence, verification may be necessary using other methods. This method is somewhat limited when used in areas with clay soil types or with a high water table.

6.2 Passive Detection Surveys

Acoustic Surveys

Acoustic location methods are generally most applicable to waterlines or gas lines. A highly sensitive Acoustic Receiver listens for background sounds of water flowing (at joints, leaks, etc.) or to sounds introduced into the water main using a transducer. Acoustics may also be applicable to determine the location of plastic gas lines.

Thermal Imaging

Thermal (i.e., infrared) imaging is a passive method for detecting the heat emitted by an object. Electronics in the infrared camera convert subtle heat differentials into a visual image on the viewfinder or a monitor. The operator does not look for an exact temperature; rather they look for heat anomalies (either elevated or suppressed temperatures) characteristic of a potential utility line.

The thermal fingerprint of underground utilities results from differences in temperature between the atmosphere and the fluid present in a pipe or the heat generated by electrical resistance. In addition, infrared scanners may be capable of detecting differences in the compaction, temperature and moisture content of underground utility trenches. High-performance thermal imagery can detect temperature differences to hundredths of a degree.

6.3 Intrusive Detection Surveys

Vacuum Excavation

Vacuum excavation is used to physically expose utility services. The process involves removing the surface material over approximately a 1' x 1' area at the site location. The air-vacuum process proceeds with the simultaneous action of compressed air-jets to loosen soil and vacuum extraction of the resulting

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debris. This process ensures the integrity of the utility line during the excavation process, as no hammers, blades, or heavy mechanical equipment comes into contact with the utility line, eliminating the risk of damage to utilities. The process continues until the utility is uncovered. Vacuum excavation can be used at the proposed site location to excavate below the "utility window" which is usually 8 feet.

Hand Excavation

When the identification and location of underground utilities cannot be positively confirmed through document reviews and/or other methods, borings and excavations may be cleared via the use of non-conductive hand tools. This should always be done in conjunction with the use of detection equipment. This would be required for all locations where there is a potential to impact buried utilities. The minimum hand-excavation depth that must be reached is to be determined considering the geographical location of the work site. This approach recognizes that the placement of buried utilities is influenced by frost line depths that vary by geographical region. Attachment 2 presents frost line depths for the regions of the contiguous United States. At a minimum, hand excavation depths must be at least to the frost line depth (see Attachment 2) plus two (2) feet, but never less than 4 feet below ground surface (bgs). For hand excavation, the hole created must be reamed large enough to be at least the diameter of the drill rig auger or bit prior to drilling. For soil gas surveys, the survey probe shall be placed as close as possible to the cleared hand excavation. It is important to note that a post-hole digger must not be used in this type of hand excavation activity.

Tile Probe Surveys

For some soil types, site conditions, and excavation requirements, non-conductive tile probes may be used. A tile probe is a "T"-handled rod of varying lengths that can be pushed into the soil to determine if any obstructions exist at that location. Tile probes constructed of fiberglass or other nonconductive material are readily-available from numerous vendors. Tile probes must be performed to the same depth requirements as previously specified. As with other types of hand excavating activities, the use of a non-conductive tile probe, should always be in conjunction with suitable utility locating detection equipment.

7.0 INTRUSIVE ACTIVITIES SUMMARY

The following list summarizes the activities that must be performed prior to beginning subsurface activities:

1. Map and mark all subsurface locations and excavation boundaries using white paint or markers specified by the client or property owner.
2. Notify the property owner and/or client that the locations are marked. At this point, drawings of locations or excavation boundaries shall be provided to the property owner and/or client so they may initiate (if applicable) utility clearance.

Note: Drawings with confirmed locations should be provided to the property owner and/or client as soon as possible to reduce potential time delays.

3. Notify "One Call" service. If possible, arrange for an appointment to show the One Call representative the surface locations or excavation boundaries in person. This will provide a better location designation to the utilities they represent. You should have additional drawings should you need to provide plot plans to the One Call service.
4. Implement supplemental utility detection techniques as necessary and appropriate to conform utility locations or the absence thereof.

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5. Complete Attachment 3, Utility Clearance Form. This form should be completed for each excavation location. In situations where multiple subsurface locations exist within the close proximity of one another, one form may be used for multiple locations provided those locations are noted on the Utility Clearance Form. Upon completion, the Utility Clearance Form and revised/annotated utility location map becomes part of the project file.

8.0 REFERENCES

OSHA Letter of Interpretation, Mr. Joseph Caldwell, Attachment 4
 OSHA 29 CFR 1926(b)(2)
 OSHA 29 CFR 1926(b)(3)
 TtNUS Utility Locating and Clearance Policy
 TtNUS SOP GH-3.1; Resistivity and Electromagnetic Induction
 TtNUS SOP GH-3.2; Magnetic and Metal Detection Surveys
 TtNUS SOP GH-3.4; Ground-penetrating Radar Surveys

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ATTACHMENT 1 **LISTING OF UNDERGROUND UTILITY CLEARANCE RESOURCES**



American Public Works Association
2345 Grand Boulevard, Suite 500, Kansas City, MO 64108-2625
Phone (816) 472-6100 • Fax (816) 472-1610
Web www.apwa.net • E-mail apwa@apwa.net

ONE-CALL SYSTEMS INTERNATIONAL CONDENSED DIRECTORY

Alabama
Alabama One-Call
1-800-292-8525

Alaska
Locate Call Center of Alaska, Inc.
1-800-478-3121

Arizona
Arizona Blue Stake
1-800-782-5348

Arkansas
Arkansas One Call System, Inc.
1-800-482-8998

California
Underground Service Alert North
1-800-227-2600
Underground Service Alert of Southern
California
1-800-227-2600

Colorado
Utility Notification Center of Colorado
1-800-922-1987

Connecticut
Call Before You Dig
1-800-922-4455

Delaware
Miss Utility of Delmarva
1-800-282-8555

Florida
Sunshine State One-Call of Florida, Inc.
1-800-432-4770

Georgia
Underground Protection Center, Inc.
1-800-282-7411

Hawaii
Underground Service Alert North
1-800-227-2600

Idaho
Dig Line Inc.
1-800-342-1585
Kootenai County One-Call
1-800-428-4950
Shoshone - Benewah One-Call
1-800-398-3285

Illinois
JULIE, Inc.
1-800-892-0123
Digger (Chicago Utility Alert Network)
312-744-7000

Indiana
Indiana Underground Plant Protection
Service
1-800-382-5544

Iowa
Iowa One-Call
1-800-292-8989

Kansas
Kansas One-Call System, Inc.
1-800-344-7233

Kentucky
Kentucky Underground Protection Inc.
1-800-752-6007

Louisiana
Louisiana One Call System, Inc.
1-800-272-3020

Maine
Dig Safe System, Inc.
1-888-344-7233

Maryland
Miss Utility
1-800-257-7777
Miss Utility of Delmarva
1-800-282-8555

Massachusetts
Dig Safe System, Inc.
1-888-344-7233

Michigan
Miss Dig System, Inc.
1-800-482-7171

Minnesota
Gopher State One Call
1-800-252-1168

Mississippi
Mississippi One-Call System, Inc.
1-800-227-6477

Missouri
Missouri One-Call System, Inc.
1-800-344-7483

Montana
Utilities Underground Protection Center
1-800-424-5555
Montana One Call Center
1-800-551-8344

Nebraska
Diggers Hotline of Nebraska
1-800-331-5666

Nevada
Underground Service Alert North
1-800-227-2600

New Hampshire
Dig Safe System, Inc.
1-888-344-7233

New Jersey
New Jersey One Call
1-800-272-1000

New Mexico
New Mexico One Call System, Inc.
1-800-321-2537
Las Cruces- Dona Ana Blue Stakes
1-888-526-0400

New York
Dig Safely New York
1-800-862-7962
New York City- Long Island One Call
Center
1-800-272-4480

North Carolina
The North Carolina One-Call Center,
Inc.
1-800-632-4949

North Dakota
North Dakota One-Call
1-800-795-0555

Ohio
Ohio Utilities Protection Service
1-800-362-2764
Oil & Gas Producers Underground
Protect'n Svc
1-800-925-0988

Oklahoma
Call Okie
1-800-522-6543

Oregon
Oregon Utility Notification Center/One
Call Concepts
1-800-332-2344

Pennsylvania
Pennsylvania One Call System, Inc.
1-800-242-1776

Rhode Island
Dig Safe System, Inc.
1-888-344-7233

South Carolina
Palmetto Utility Protection Service Inc.
1-888-721-7877

South Dakota
South Dakota One Call
1-800-781-7474

Tennessee
Tennessee One-Call System, Inc.
1-800-351-1111

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ATTACHMENT 1 (Continued)

Texas

Texas One Call System
1-800-245-4545
Texas Excavation Safety System, Inc.
1-800-344-8377
Lone Star Notification Center
1-800-669-8344

Utah

Blue Stakes of Utah
1-800-662-4111

Vermont

Dig Safe System, Inc.
1-888-344-7233

Virginia

Miss Utility of Virginia
1-800-552-7001
Miss Utility (Northern Virginia)
1-800-257-7777

Washington

Utilities Underground Location Center
1-800-424-5555
Northwest Utility Notification Center
1-800-553-4344
Inland Empire Utility Coordinating
Council
509-456-8000

West Virginia

Miss Utility of West Virginia, Inc.
1-800-245-4848

Wisconsin

Diggers Hotline, Inc.
1-800-242-8511

Wyoming

Wyoming One-Call System, Inc.
1-800-348-1030
Call Before You Dig of Wyoming
1-800-849-2476

District of Columbia

Miss Utility
1-800-257-7777

Alberta

Alberta One-Call Corporation
1-800-242-3447

British Columbia

BC One Call
1-800-474-6886

Ontario

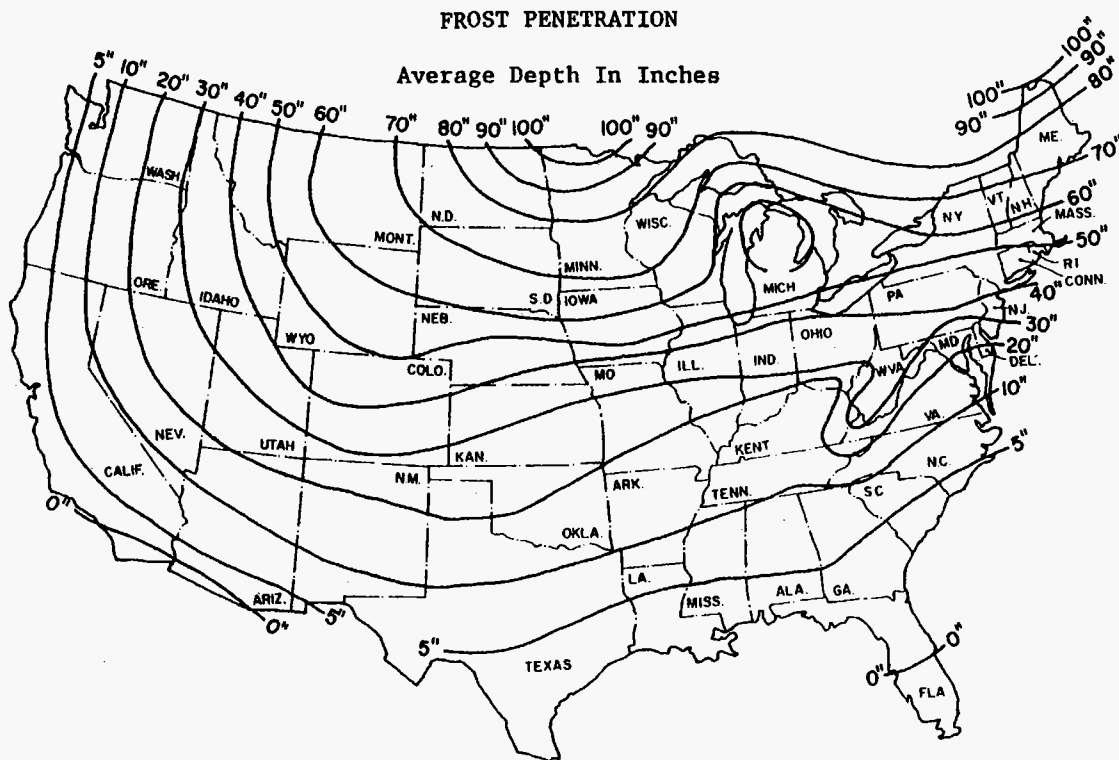
Ontario One-Call System
1-800-400-2255

Quebec

Info-Excavation
1-800-663-9228

ATTACHMENT 2

FROST LINE PENETRATION DEPTHS BY GEOGRAPHIC LOCATION



Courtesy U.S. Department Of Commerce

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**ATTACHMENT 3
UTILITY CLEARANCE FORM**

Client: _____ Project Name: _____
 Project No.: _____ Completed By: _____
 Location Name: _____ Work Date: _____
 Excavation Method/Overhead Equipment: _____

1. Underground Utilities Circle One
- a) Review of existing maps? yes no N/A
- b) Interview local personnel? yes no N/A
- c) Site visit and inspection? yes no N/A
- d) Excavation areas marked in the field? yes no N/A
- e) Utilities located in the field? yes no N/A
- f) Located utilities marked/added to site maps? yes no N/A
- g) Client contact notified yes no N/A
 Name _____ Telephone: _____ Date: _____
- g) State One-Call agency called? yes no N/A
 Caller: _____
 Ticket Number: _____ Date: _____
- h) Geophysical survey performed? yes no N/A
 Survey performed by: _____
 Method: _____ Date: _____
- i) Hand excavation performed (with concurrent use of utility yes no N/A
 detection device)?
 Completed by: _____
 Total depth: _____ feet Date: _____
- j) Trench/excavation probed? yes no N/A
 Probing completed by: _____
 Depth/frequency: _____ Date: _____
2. Overhead Utilities Present Absent
- a) Determination of nominal voltage yes no N/A
- b) Marked on site maps yes no N/A
- c) Necessary to lockout/insulate/re-route yes no N/A
- d) Document procedures used to lockout/insulate/re-route yes no N/A
- e) Minimum acceptable clearance (SOP Section 5.2): _____

3. Notes: _____

Approval:

 Site Manager/Field Operations Leader

 Date

c: PM/Project File
 Program File

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ATTACHMENT 4 OSHA LETTER OF INTERPRETATION

Mr. Joseph Caldwell
Consultant
Governmental Liaison
Pipeline Safety Regulations
211 Wilson Boulevard
Suite 700
Arlington, Virginia 22201

Re: Use of hydro-vacuum or non-conductive hand tools to locate underground utilities.

Dear Mr. Caldwell:

In a letter dated July 7, 2003, we responded to your inquiry of September 18, 2002, regarding the use of hydro-vacuum equipment to locate underground utilities by excavation. After our letter to you was posted on the OSHA website, we received numerous inquiries that make it apparent that aspects of our July 7 letter are being misunderstood. In addition, a number of industry stakeholders, including the National Utility Contractors Association (NUCA), have provided new information regarding equipment that is available for this work.

To clarify these issues, we are withdrawing our July 7 letter and issuing this replacement response to your inquiry.

***Question:** Section 1926.651 contains several requirements that relate to the safety of employees engaged in excavation work. Specifically, paragraphs (b)(2) and (b)(3) relate in part to the safety of the means used to locate underground utility installations that, if damaged during an uncovering operation, could pose serious hazards to employees.*

Under these provisions, what constitutes an acceptable method of uncovering underground utility lines, and further, would the use of hydro-vacuum excavation be acceptable under the standard?

Answer

Background

Two sections of 29 CFR 1926 Subpart P (Excavations), 1926.651(Specific excavation requirements), govern methods for uncovering underground utility installations. Specifically, paragraph (b)(2) states:

When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours * * * or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used. (emphasis added).

Paragraph (b)(3) provides:

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When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means. (emphasis added).

Therefore, “acceptable means” must be used where the location of the underground utilities have not been identified by the utility companies and detection equipment is not used.

Subpart P does not contain a definition of either “other acceptable means” or “safe and acceptable means.” The preambles to both the proposed rule and the final rule discussed the rationale behind the wording at issue. For example, the preamble to the proposed rule, 52 Fed. Reg. 12301 (April 15, 1987), noted that a 1972 version of this standard contained language that specified “careful probing or hand digging” as the means to uncover utilities. The preamble then noted that an amendment to the 1972 standard later deleted that language “to allow other, *equally effective means* of locating such installations.” The preamble continued that in the 1987 proposed rule, OSHA again proposed using language in section (b)(3) that would provide another example of an acceptable method of uncovering utilities that could be used where the utilities have not been marked and detection equipment is not being used – “probing with hand-held tools.” This method was rejected in the final version of 29 CFR 1926. As OSHA explained in the preamble to the final rule, 54 Fed. Reg. 45916 (October 31, 1989):

OSHA received two comments * * * and input from ACCSH [OSHA’s Advisory Committee on Construction Safety and Health] * * * on this provision. All commenters recommended dropping ‘such as probing with hand-held tools’ from the proposed provision, because this could create a hazard to employees by damaging the installation or its insulation.

In other words, the commenters objected to the use of hand tools being used unless detection equipment was used in conjunction with them. OSHA then concluded its discussion relative to this provision by agreeing with the commentators and ultimately not including any examples of “acceptable means” in the final provision.

Non-conductive hand tools are permitted

This raises the question of whether the standard permits the use of hand tools alone -- without also using detection equipment. NUCA and other industry stakeholders have recently informed us that non-conductive hand tools that are appropriate to be used to locate underground utilities are now commonly available.

Such tools, such as a “shooter” (which has a non-conductive handle and a snub nose) and non-conductive or insulated probes were not discussed in the rulemaking. Since they were not considered at that time, they were not part of the class of equipment that was thought to be unsafe for this purpose. Therefore, we conclude that the use of these types of hand tools, when used with appropriate caution, is an “acceptable means” for locating underground utilities.

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ATTACHMENT 4 (Continued)

Hydro-vacuum excavation

It is our understanding that some hydro-vacuum excavation equipment can be adjusted to use a minimum amount of water and suction pressure. When appropriately adjusted so that the equipment will not damage underground utilities (especially utilities that are particularly vulnerable to damage, such as electrical lines), use of such equipment would be considered a "acceptable means" of locating underground utilities. However, if the equipment cannot be sufficiently adjusted, then this method would not be acceptable under the standard.

Other technologies

We are not suggesting that these are the only devices that would be "acceptable means" under the standard. Industry stakeholders have informed us that there are other types of special excavation equipment designed for safely locating utilities as well.

We apologize for any confusion our July 7 letter may have caused. If you have further concerns or questions, please feel free to contact us again by fax at: U.S. Department of Labor, OSHA, Directorate of Construction, Office of Construction Standards and Compliance Assistance, fax # 202-693-1689. You can also contact us by mail at the above office, Room N3468, 200 Constitution Avenue, N.W., Washington, D.C. 20210, although there will be a delay in our receiving correspondence by mail.

Sincerely,

Russell B. Swanson, Director
Directorate of Construction

NOTE: OSHA requirements are set by statute, standards and regulations. Our interpretation letters explain these requirements and how they apply to particular circumstances, but they cannot create additional employer obligations. This letter constitutes OSHA's interpretation of the requirements discussed. Note that our enforcement guidance may be affected by changes to OSHA rules. Also, from time to time we update our guidance in response to new information. To keep apprised of such developments, you can consult OSHA's website at <http://www.osha.gov>.

ATTACHMENT VI

EQUIPMENT INSPECTION CHECKLIST

- Are fueling cans used with this equipment approved type safety cans? _____ ☐ ☐
- Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use? _____ ☐ ☐

Portable Power Tools:

- Tools and Equipment in Safe Condition? _____ ☐ ☐
- Saw blades, grinding wheels free from recognizable defects (grinding wheels have been sounded)? _____ ☐ ☐
- Portable electric tools properly grounded? _____ ☐ ☐
- Damage to electrical power cords? _____ ☐ ☐
- Blade guards in place? _____ ☐ ☐
- Components adjusted as per manufacturers recommendation? _____ ☐ ☐

Cleanliness:

- Overall condition (is the decontamination performed prior to arrival on-site considered acceptable)? _____
- Where was this equipment used prior to its arrival on site? _____
- Site Contaminants of concern at the previous site? _____
- Inside debris (coffee cups, soda cans, tools and equipment) blocking free access to foot controls? _____

Operator Qualifications (as applicable for all heavy equipment):

- Does the operator have proper licensing where applicable, (e.g., CDL)? _____
- Does the operator, understand the equipments operating instructions? _____
- Is the operator experienced with this equipment? _____
- Does the operator have emotional and/or physical limitations which would prevent him/her from performing this task in a safe manner? _____
- Is the operator 21 years of age or more? _____

Identification:

- Is a tagging system available, for positive identification, for tools removed from service? _____

Additional Inspection Required Prior to Use On-Site

- | | Yes | No |
|--|--------------------------|--------------------------|
| – Does equipment emit noise levels above 90 decibels? | <input type="checkbox"/> | <input type="checkbox"/> |
| – If so, has an 8-hour noise dosimetry test been performed? | <input type="checkbox"/> | <input type="checkbox"/> |
| – Results of noise dosimetry: _____ | | |
| – Defects and repairs needed: _____ | | |
| – General Safety Condition: _____ | | |
| – Operator or mechanic signature: _____ | | |
| Approved for Use: <input type="checkbox"/> Yes <input type="checkbox"/> No | | |

Site Safety Officer Signature